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## No. 1, ORIGINAL

# In the Supreme Court of the United States

October Term, 1914.

The State of Georgia, plaintiff,

*vs.*

The Tennessee Copper Company

*and*

The Ducktown Sulphur, Copper and Iron Company Limited, defendants.

IN EQUITY.

## BRIEF AND ARGUMENT ON BEHALF OF THE DEFENDANT, DUCKTOWN SULPHUR, COPPER & IRON COMPANY, LIMITED, ON MOTION FOR FINAL DECREE.

W. B. MILLER,
J. A. FOWLER,
*Solicitors for Defendant*
*Ducktown S. C. & I. Co.*

# INDEX

General Statement .......... 3
Since May 13, 1907, Defendant Company Has Improved its Plant by Installing an Acid Plant, and Amount of Fumes now Escaping Insufficient to Cause Appreciable Damages in Georgia .......... 6
Condition of Crops, etc., Improved over 1907, and Little or no Damage now Being Done by Smoke from Furnaces of Both this Defendant and Tennessee Copper Company .......... 11
Conditions of Forests in North Georgia .......... 13
Improvement Since 1907 and Present Condition in Ducktown Basin and Localities Adjacent Thereto .......... 25
Improvement Since 1907 and Present Condition in and around Mineral Bluff .......... 33
Improvement Since 1907 and Present Condition in Vicinity of Morganton .......... 37
Plaintiff's Evidence as to Injuries to Vegetation from Smoke Fumes and Defendant's Evidence in Rebuttal .. 39
Epworth, Fighting Town Creek, Madola, Pierceville, Barnes Mountain, Granny Marr Mountain, Mule Top Mountain, Higdon's Store, Little Fighting Town Creek, Tumbling Creek, Jacks River, Patterson Branch, Adams .......... 40
Ellijay, Yukon, Turnip Town, Mountain Creek, Carter Cay and Other Points in Ellijay Region .......... 46
Blue Ridge, Weaver's Creek, Morganton, Mineral Bluff 54
Photographs Filed as Evidence .......... 59
Timber in Georgia Has Been Killed by Fires, Worms and Other Causes .......... 70
Forests Elsewhere Than in Georgia in Worse Condition and Contain More Dead and Dying Timber .......... 71
Any Injury Done Now or for Last Five Years by Sulphur Fumes Produced by Smoke of Tennessee Copper Company and Not This Defendant .......... 75
Relative Locations, Constructions, Capacities and Operations of the Two Furnaces .......... 77
Location of Tennessee Furnace More Favorable for Transmission of Smoke into Georgia Than That of Ducktown Company .......... 77
Construction of Tennessee Furnace More Favorable for Transmission of Smoke into Georgia Than That of Ducktown Furnace .......... 78
Capacity and Amount of Ore Consumed by Tennessee Plant in Excess of That of This Defendant, While Defendant's Acid Plant Has Greater Relative Efficiency .......... 79
Ore Used by Tennessee Company Contains Higher Per Cent of Sulphur Than That Smelted by Defendant, And in Smelting a Larger Per Cent of Sulphur is Extracted from the Ore and Emitted into the Atmosphere .......... 80

This Defendant has Exercised Far More Care to Avoid Emission of Fumes Than has the Tennessee Company 81
Opinion of Experts no Damage can be Done in Georgia by Fumes Escaping from this Defendant's Furnace.... 82
Injuries on June 8th, and 9th, 1914,.................. 85
No Damage Before 1906, and as Defendant has not Increased Amount of Fumes But Has Improved Its Plant by Construction of Acid Plant it is Impossible That Injuries in Georgia Now Result From Operation of Defendant's Furnace .......................... 89
Injury to Forests in North Georgia Shown to be Due to Operations of Tennessee Plant by Growth Checks of Timber ........................................ 96
Smoke Claimed to Have Been Seen in Georgia July 1st, to 5th, 1914, and May 12th, 1913 ................. 100
Changed Conditions as Respects Litigants Since 1907, Georgia Has Now No Equitable Right to Insist upon Final Injunctive Decree Against the Ducktown Copper Company ................................... 109
Evidence Falls Short of Making Out Case for Injunctive Decree Under Rule Laid Down on First Hearing, and Under General Rules of Law Relating to Abatement of Public Nuisances ........................... 121
Having Entered Into a Stipulation With the Tennessee Copper Company Whereby it is Permitted to Float Smoke Over its Domain and Having Made Similar Offer to This Defendant, Plaintiff is Not Now Entitled to Any Injunctive Decree Against this Defendant...... 124
In Action to Enjoin Nuisance Decree of Injunction Disallowed if Nuisance Voluntarily Abated During Pendency of Suit ................................ 126

## CASES CITED.

Arizona Copper Co. v. Gillespie, 230 U. S., 46, 55, 57.
Attorney General v. Delaware and Bound Brook R. R. Co., 27 N. J. Eq. (12 C. E. Green), 1.
29 CYC., 1252.
Georgia v. Tennessee Copper Co., 206 U. S., 230, 236, 237, 238.
1 High on Injunctions (4 Ed.) Sec. 572.
1 High on Injunctions (4 Ed.) Sec. 760.
King v. Morris & Essex Railroad Company, 18 N. J. Eq., 397, 399, 400.
McCarthey v. Gaston Ridge Mill, etc., Co., 144 California, 542-546.
Mississippi & Missouri R. Co. v. Ward, 2 Black, 485-495.
Missouri v. Illinois, 200 U. S., 496, 521.
Perry v. Howe Co-operative Creamery Company, 125 Ia., 415-417.
Trulock v. Merte, 72 Ia., 510-513.
Valentine v. Webb, 84 Mich., 38, 46, 49.

# In the Supreme Court of the United States

OCTOBER TERM, 1914.

NO. 1—ORIGINAL.

THE STATE OF GEORGIA, PLAINTIFF,
*vs.*
THE TENNESSEE COPPER COMPANY
*and*
THE DUCKTOWN SULPHUR, COPPER & IRON CO., LIMITED, DEFENDANTS.

*Brief and argument on behalf of the defendant, Ducktown Sulphur, Copper & Iron Company, Limited, on motion for final decree.*

## GENERAL STATEMENT.

This case was originally heard on affidavits on February 25th and 26th, 1907, and an opinion was handed down on May 13, 1907, wherein the Court found in the most general terms, that defendants were committing a public nuisance in the State of Georgia, by emitting from their furnaces used in smelting ores noxious fumes and gases, but in order to allow a reasonable time to the defendants to complete the efforts they were making to stop the fumes, the Court postponed the entrance of a final decree till the October Term, 1907. At that term the following entry was made:

> "Mr. John C. Hart, of counsel for the complainant, submitted to the consideration of the Court a motion to postpone the entry of the final decree in this case.
>
> "October 21, 1907.
>
> "On consideration of the motion to postpone the entry of final decree in this cause, it is now here ordered by the Court that the time to present the form of the final decree to be entered herein, be, and the same is hereby, enlarged as counsel may be advised, without prejudice, and on due notice.
>
> "October 28, 1907."

On August 13, 1913, the legislature of the State of Georgia passed a resolution, wherein after reciting an agreement between the State of Georgia and the Tennessee Copper Company, it was provided: "that the Governor be and he is hereby authorized and directed to enter into an agreement or stipulation with the Ducktown Sulphur, Copper & Iron Company (Limited), for the same length of time and under the same terms, conditions and limitations as are mentioned and provided by said contract with the Tennessee Copper Company, and with the exception that, the amount to be deposited by the said Ducktown Copper & Iron Company (Limited) for the arbitration of claims, shall be the annual sum of eight thousand five hundred ($8,500) dollars, to be deposited and distributed under the same terms and conditions and with the same provisions and limitations as are provided in said contract with the Tennessee Copper Company, as set out in said above mentioned resolution.

"*Be it further resolved,* That in the event the said Ducktown Sulphur, Copper & Iron Company (Limited) shall fail, refuse or decline to enter into such contract with the State of Georgia, and to deposit said fund annually as above set out, the Governor is authorized and directed to make prompt application for final decree of injunction against said defendant, Ducktown Sulphur, Copper & Iron Company (Limited) in said cause in the United States Supreme Court."

The defendant Ducktown Company, believing that if it ever had committed, or in any way had participated in the commission of a nuisance in the State of Georgia, it had long since ceased to do so, and that for at least the previous five years it had been strictly complying with the law, refused to enter into the agreement proposed by the State of Georgia, but did propose to the Governor and the Attorney General of the State that the matter be submitted to a body of scientists authorized to investigate and report as to whether or not its operations were doing any substantial injury within the State of Georgia, the expense of the Commission and of the inquiry to be borne by this defendant; but those officials regarded the resolution of the Legislature as mandatory, leaving them no discretion in the matter; and at the last term of this Court the Attorney General entered a motion for a decree awarding a perpetual injunction against this defendant, which motion was resisted; and after a hearing, on the 13th day of April, 1914, the Court entered the following order:

> "On consideration of the motion of counsel for the complainant to enter a final decree against the defendant, The Ducktown Sulphur, Copper & Iron Company, Limited, and of the argument of counsel thereupon had, as well in support of as against the same.
>
> 1. It is now here ordered that the further consideration of said motion be and the same is hereby postponed until the next term.
>
> 2. It is further ordered by the Court that leave be and the same is hereby granted to the said defendant to take additional testimony by depositions (or by affidavits, if the parties consent thereto) to be taken before any officer in the State of Georgia or Tennessee authorized to take depositions by the

laws of said states upon ten days' notice to the counsel for the complainant, said additional testimony so to be taken to relate solely to the changed condition, if any, which may have arisen since the case was here decided, said testimony to be concluded on or before the first day of July, 1914.

3. It is further ordered that the complainant may take additional testimony in the same manner, such testimony to be concluded on or before the first day of September, 1914, and all of said testimony both for said defendant and said complainant to be filed with the Clerk of this Court on or before September 15th, 1914.

April 13th, 1914."

Much testimony was taken by both plaintiff and defendant within the time specified; and subsequently, evidence in rebuttal was taken by defendant, permission to do so having first been obtained from the Court.

## BRIEF AND ARGUMENT.

### I.

**Since May 13th, 1907, the defendant Company has made every effort to improve its plant so as to prevent the emission of sulphur fumes, and at an expense of more than $600,000.00 it has installed an acid plant, which extracts from the smoke a very large per cent of its poisonous element (Sulphur dioxide) and converts it into sulphuric acid, and the amount of fumes now permitted to escape is wholly insufficient to cause any appreciable damages to the forests or any other vegetable growth in the State of Georgia.**

The evidence upon this subject is as follows:

W. F. LAMOREAUX is assistant to the general manager of the Ducktown Company and has been connected with it since April, 1905. He says the acid plant was put into operation on June 11th, 1909. Prior to that time there was an experimental acid plant constructed at a cost of more than $40,000.00, but this was abandoned in favor of the chamber process, the one finally adopted (Vol. 2, pp. 795-6). The cost of the present plant up to the time it was put into operation was approximately $600,000.00. The plant has been operated ever since its construction with the exception of a few occasions when repairs were made to the furnace. This plant was installed in an effort to conform to the ruling of this Court. Many years have been spent and many thousands of dollars with the idea of utilizing the sulphuric acid in the air aside from the question of injury from the smoke. When the threatened injunction was held over the company they made very strenuous efforts to utilize the best scientific knowledge with the idea of entirely eliminating the nuisance, and the acid plant was constructed more for that purpose than with a commercial view, it being doubtful whether it would be of any commercial value. In fact, after consultation with engineers they believed no profit would be realized from its operation. The plant was designed and its construction undertaken by L. N. Haynes, of LaSalle, Ill., who bears the reputation of being one of the leading sulphur manufacturers along scientific lines in the United States. He was then employed in Germany in the sulphuric acid business. From the time the plant has been put in operation it has been a complete success (Vol. 2, pp. 797-8).

For illustration the witness states the amount of sulphur in the ore consumed during the year 1913, and what became of the same, as follows:

There was contained in the ores treated 29,783.19 tons of sulphur. Of that sulphur content 1387.72 tons remained in the matt; 12,408.42 tons were converted into sulphuric acid; 2,536.3 tons remained in the slag; 348.7 tons was contained in the flue dust, the sum total accounted for being 16,680.64 tons or 56%, leaving 13,002.55 tons not specifically accounted for (Vol. 2, p. 813). No allowance is here given for a great amount of smoke around the furnace, the amount taken up in acid compounds, contents in the shape of flowers of sulphur and some which escapes as gas hydrates and other harmless compounds (Vol. 2, p. 818).

Therefore, while in 1907 none of this sulphur was converted into sulphuric acid, during the year 1913 there were 12,408.42 tons, or 41½% of all the sulphur contained in the ores thus eliminated from the smoke, which represents the improvement in method of manufacture in 1913 over that pursued in 1907. Before the installation of the acid plant about 85½% of the sulphur escaped into the air, and if it be conceded that this high per cent was the cause of some damage to forests and crops in Georgia, yet certainly, when this is reduced 41½% *of the whole, or about one-half* of that remaining, it is rendered harmless by diffusion, long before it reaches the Georgia line.

Furthermore, a very much less quantity of ore is smelted by the Ducktown Company during the growing season. For illustration, in June, July and August, 1913, there was produced 2,572,462 pounds of matt while in October, November and December of the same year there were 3,432,540 pounds produced, or a difference of 860,078 pounds (Vol. 2, p. 817).

The general manager has given instructions ever since the building of the acid plant that the furnace production be curtailed during the growing season of the year, that is from May until September (Vol. 2, p. 818), the prime reason of doing so being to comply with their promises and obligations to the State of Georgia (Vol. 2, p. 819).

W. M. BOWRON, who was educated at Edinburgh, and was once chief assistant to George Lunge, Professor of the University of Zurich and the accepted text book writer on production of sulphuric acid, testifies that he was selected by Joseph Brown, Governor of Georgia, to examine the Ducktown Basin and report upon the conditions there (Vol. 2, p. 770). His visit to the Ducktown plant was not announced beforehand, but he found but one furnace in operation and the acid plant was able to take care of all the fumes emitted (Vol. 2, p. 772). Subsequently he made other visits in that section for the Ducktown Company. He took with him a chemical apparatus and applied tests which would show up to one forty thousandth of one per cent. He tested going farther from the Isabella plant until there was no indication of sulphur fumes at all. Two sets of tests were made, one when the wind was blowing Northward, away from Georgia, and the other when it was blowing towards Georgia. The distance sulphur fumes could be detected away from Isabella plant in the direction of Georgia is indicated on map filed as Ex. No. "1" to his deposition, by red lines, and the distance it could be detected when the wind was blowing towards Georgia is indicated by the yellow lines. At the points represented by the two lines no gases could be detected (Vol. 2, pp. 773-4), *and he found no evidence of sulphur fumes at any point greater than one-half mile from the furnace towards the Georgia line* (Vol. 2, p. 787). He thinks that the gas which escapes from the furnace is absolutely negligible (Vol. 2, p. 792).

PETER S. GILCHRIST is fifty-one years of age, and his profession is building acid plants and plants to take care of noxious vapors, and he is familiar with the law of diffusion of gases (Vol. 2, pp. 821-2).

DR. J. M. McCANDLESS, of Atlanta, *was for ten years chemist for the State of Georgia* (Vol. 2, p. 835).

In September, 1913, at the instance of the Ducktown Company, Mr. Gilchrist and Dr. McCandless visited its plant together (Vol. 2, pp. 821-3). Mr. Renwick, the Superintendent, told them to examine the plant and report the facts, and they did so. Mr. Gilchrist says he found the acid plant working as fine as any plant he ever saw. There was only a mere trace of sulphur escaping, and it was practically all going through the condensing chambers. Mr. Renwick opened his books, and they took the amount of ores smelted every day for the preceding three months and the analysis of same, and they calculated the amount of sulphur that was charged into the furnace. They then took the amount of sulphuric acid produced, the amount of sulphur left in the matt and in the slag and flue dust, and estimated that the remainder passed away as sulphur dioxide. In that way they found that the company was recovering about seventy-five or eighty-five per cent of the sulphur, and some twenty-two or twenty-three per cent was lost. There was a total of thirty-two thousand pounds of sulphur, making a liberal calculation, equivalent to sixty-four thousand pounds of sulphur dioxide, liberated into the air daily. They then estimated that the wind would always come from the North, which was unfair to the company, and blow all of that sulphur dioxide towards the South, and they calculated that the diffusion would be such before it would reach the State of Georgia that the combination of sulphur dioxide with the air would be in the proportion of one part to three and one-half millions. This calculation assumed that the entire amount that escaped would be transmitted into Georgia, and took no account whatever of what would be absorbed by streams, soil and trees or anything that would deflect it upward into the air, though naturally the greater part of it would most likely be diffused and carried upward and laterally into other territory (Peter Gilchrist, Vol. 2, pp. 823-4; Dr. McCandless, Vol. 2, pp. 837-8).

The discrepancy between Mr. Lamoreaux's figures and those of these witnesses as to the amount of sulphur unaccounted for is due to the fact that their estimates were based on figures for summer months, while Mr. Lamoreaux's extends over the entire year (Vol. 2, pp. 831-2).

Mr. Gilchrist says that in Chattanooga there is nearly precisely the same amount of sulphur fumes discharged into the air from the burning of soft coal, and he has been in Chattanooga many times when he could find traces of it (Vol. 2, pp. 823-4); that the relative sulphur dioxide content in the atmosphere in cities like Cincinnati, Cleveland, Columbus, Chicago or Atlanta is very similar to the amount of sulphur dioxide found in the atmosphere around the Ducktown plant; and that in London, England, it has been ascertained by Government experts that for each square mile in the city, in the summer there are eighteen tons of sulphur in the coal consumed, and in the winter forty-one tons, and the sulphur dioxide produced therefrom is twice that amount. He does not think that as much sulphur dioxide proportionately reaches the State of Georgia from the Ducktown plant as there is in Cleveland, Chicago, and other cities of that character (Vol. 2, pp. 832-4). And he thinks if all the fumes escaping from the stack were to go in the direction of Georgia they would exert no effect on vegetation, because they would be diluted to such an extent that they could do no damage (Vol. 2, p. 832).

Dr. McCandless says he is familiar with the effect of sulphur dioxide on vegetation, and has made a study of the section of the country around the furnaces, and he thinks it is absolutely impossible for the operations of the Ducktown plant to have any harmful effect on the forests and gardens in Fannin County, Georgia. They stayed over night, and left the window of the room in which they were sleeping open, and though the wind was blowing in their direction and they were but a half mile away from the furnace, they were not bothered with fumes.

## II.

**The condition of the crops, forests and gardens in North Georgia has vastly improved over what they were in 1907, and but little or no damage is now being done by smoke escaping from the furnaces of both the defendant and the Tennessee Copper Company.**

The evidence shows that the Tennessee Company has also constructed an acid plant which went into operation in 1908. The relative capacities of the two furnaces and efficiency of their acid plants will be hereafter considered. The evidence leaves no room for doubt that as a result of these improvements conditions in North Georgia have vastly improved. But plaintiff attempts to show that notwithstanding these improvements the injuries are yet so extensive that the law as heretofore declared in this case is being violated, and the most controverted question of fact in the case is whether or not any material damage has been produced in the State of Georgia by fumes escaping from the furnaces within the last three years; to-wit: 1912, 1913 and 1914. Defendant insists that, inasmuch as it is not disputed that the plants have been improved, and that as it is conclusively shown that conditions of the forests and vegetation in general are much better than when the case was decided in 1907, the burden is upon the plaintiff to show that this defendant is violating the law.

In order that the defendant be not prejudiced by the conflict of evidence upon this subject, *it must be kept in mind that the testimony relates to all damages resulting from escaping fumes, there being no effort, except to the very slight extent hereinafter mentioned, to show specifically that the injury claimed was produced by fumes escaping from defendant's furnaces.*

The length of the brief upon this subject it is believed is excusable because it is impossible to form any correct conception as to the weight of the evidence without making brief reference to the substance of the testimony of many of the witnesses.

A number of maps are on file as exhibits to the evidence of different witnesses, but by agreement have not been reproduced. Among them is a map of the Government survey of that section of North Georgia with reference to which special complaint is made, and of that part of Tennessee which immediately surrounds the furnaces, photographed and magnified to twice the original size by the witness J. E. Thompson, and upon it is traced the tour made by Mr. Thompson when taking one hundred and forty-two color photographs. For the convenience of the Court a duplicate for each member has been reproduced, and there has also been traced thereon from the evidence tours made by other witnesses for both plaintiff and defendant. It is suggested that consultation of this map in connection with the evidence upon this subject will be helpful.

**1st. The evidence upon this question introduced in chief by defendant:**

(1) *The condition of forests, crops and gardens in North Georgia as described by those who have traveled through and observed a considerable section of one or more counties.*

W. F. NAUGHAN. Witness went with a party through Fannin and Gilmer Counties and a part of Pickens, for the purpose of ascertaining what the damage was to the timber and vegetation. In 1913 he was out about twenty days on one trip and other times a day or two. (Vol. 1, p. 564).

In the section lying immediately adjacent to the Ducktown Basin they found the crops and vegetation in advance of anything he expected, in fact he didn't see any smoke damage at all. They went out especially to ascertain if damage had been done to Mr. Vestal, but went over various other lands near the Basin. In 1912 the apple crop was the finest he almost ever saw, but it wasn't so good in 1913. The trees were not full, but he doesn't know whether it was the frost that killed the crop or not, but there were late frosts in the spring of 1913. Corn and other grain crops were in splendid condition (Vol. 1, pp. 564-5).

J. M. SENTER. In 1912 and '13 witness at the instance of the Ducktown Company spent about eight days on one trip and probably five or six on another in traveling out towards Ellijay, Jacks River, Cow Pen Mountains and Blue Ridge and through the section that lies immediately South of the Tennessee line. The trips were made in September or October. He didn't see anything wrong with the crops and gardens, and the grain, apple and other fruit crops were good. He knows how smoke affects timber, but he detected no damage of that character. He found the crops and timber in good condition, better than they were before the acid plants of the two companies were put in operation in 1908 and 1909. The crops and fruit he saw in 1912 and

'13 were about the same as he saw in sections hundreds of miles away from Ducktown (Vol. 1, pp. 577-9).

A man by the name of Winthrop pointed out some damages in his orchard, and the witness went over it with him, and it was found that the tree was being killed by black bark and borer worm and not by smoke (Vol. 1, p. 582).

G. C. PARKS. Witness spent eight days in 1912 in the North Georgia territory that lies immediately South of the Ducktown Basin looking for smoke injuries, and in 1913 probably three or four days. He was a member of the party that camped on Jacks River. He doesn't think any damage was being done at that time. They had very fine fruit close to the furnaces; and they secured vegetables for use on Jacks River (Vol. 1, p. 590).

SHERMAN REESE, agent for the Ducktown Company, spent eight days in 1912 on the Vestal land and in 1913 spent twenty-one days on lands of Vestal and Casker Lumber Company (Vol. 2, p. 630). The condition of the timber, crops, gardens, etc., was good in both years, except in 1913 it was dry.

While camping on Jacks River they were furnished supplies of vegetables, grain and fruit from the farmers, and they were of splendid quality. The condition of the territory between that section and Copper Hill up to say within two miles of Copper Hill was good. He found absolutely no damage being done by smoke in that section. In 1912 the fruit was very fine. It was not so good in 1913, owing to the late frost. As they traveled outwardly from say a two mile radius of the Copper Hill plant they found no sign of smoke in that country. From their camp on Jacks River they traveled in all directions, riding back and forth through the forests and by the fields, and they walked through places where they couldn't ride. They were on the side of the mountains facing the copper plants. The condition of timber there was very good (Vol. 2, pp. 632-3).

W. G. PAYNE lives in Cherokee County, North

Carolina, and has represented that county in the State Legislature. He went with a party on Frog Mountain, and was there six or eight days. They went through that section, and around above Morganton and back to the North Carolina line. He also went on one or two other trips, all of them made within the last three years (Vol. 2, p. 707). They were provided with horses, but sometimes it was so rough that they couldn't ride, and they went on foot. He went out to ascertain the condition of the crops and timber through that section of North Georgia, and had no interest in the result, and his object was to honestly ascertain the facts. They were in places that were most exposed to smoke. In the years 1911, '12 and '13 they found the crops, orchards and forests in as good condition as any section, according to the quality of the land. He saw no sign of Ducktown smoke on them (Vol. 2, p. 708).

L. A. HUGHES is sixty-four years old, and brother of Judge Hughes of the Court of Civil Appeals of Tennessee. He has made a specialty of examining and purchasing large boundaries of timber for thirty years (Vol. 2, p. 717), and has had farming carried on. In 1912 at the instance of the Tennessee Copper Company he with others went through the section of Fannin County, Georgia, that lies South, Southeast and Southwest of Copper Hill. After they left Copper Hill a mile or so they found the orchards, gardens, fields and forests looking fine. They went through the timber as far as Jacks River, and were also on Fighting Town and Tumbling Creeks (Vol. 2, p. 718), and through Cow Pen Mountain section, on the sides and faces towards Copper Hill, and while they found some dead timber yet there were places away from there worse than on those sections (Vol. 2, p. 719).

J. A. MILLER has been farming for several years and engaged in the saw mill business and dealing in real estate for eight or nine years, and has bought and sold timber. At the instance of the Ducktown Company he went through the North Georgia section looking over timber and crops. He started on September 9th, 1913, and was there nineteen or twenty days going through the forests and by fields and orchards and gardens. He completely crossed Fannin County. He found the vegetable crops much better there than they were where he lived, at Athens, Tennessee. Everything was green and nice, and was looking prosperous. He was on Fighting Town Creek and Jacks River and in parts of Gilmer County and on most exposed parts of the mountains (Vol. 2, pp. 723-5).

W. L. DALTON lives at Copper Hill, and was with the gentlemen that inspected the Vestal property in September, 1912. They were out six or seven days and made a thorough examination of it. The timber was green. Vestal had the finest chestnut timber witness ever saw, although they claim chestnut is easy killed by the smoke. The damage they saw looked like it was from fire scald rather than smoke; he saw lots of fire signs where laps had been gathered around the other timber and burnt (Vol. 2, p. 723).

C. G. BAUGH is County Surveyor of Fannin County, and has inspected a good deal of timber (Vol. 2, p. 685). He says there is more corn raised in Fannin County now than was raised five or six years ago. Corn is now plentiful in the county, and they have corn to sell.

While the defendant's evidence was being taken, this witness, W. T. S. Dickey, G. P. Dickey and J. H. Quintrell made a trip up Flat Creek in an automobile. They looked at the timber on both sides of the creek and made as careful observation as they could. They also looked at the vegetation, the gardens, fields and crops, and they couldn't see any evidence of damage. The foliage was in good condition, green and growing. As far as he could see the leaves did not appear in any way to have been burnt by smoke. The crops looked well, the corn fairly well. They went from the mouth of Flat Creek to the head of it, and then they came back and went up another prong to its head, and the condition of that prong was about the same as far as the foliage was concerned. He noticed a good looking field of oats. He was on lands belonging to Mr. Shippen, and the forests on those lands looked as well as any forest he had ever been over (Vol. 2, pp. 857-8). As to the conditions of the forests, crops and gardens on Flat Creek this witness is fully corroborated by W. T. S. Dickey, Vol. 2, pp. 848-851; J. H. Quintrell, Vol. 2, p. 862; and G. P. Dickey, Vol. 2, pp. 874-5; and also by H. P. Davenport, who lives on Flat Creek, Vol. 2, pp. 872-3.

TOM CURTIS lives in Mineral Bluff and runs a threshing machine and threshes wheat over a considerable part of Fannin County. After the tall stack was built, and before the acid plants were put in, conditions were pretty bad at times; a good many leaves were killed and some timber through the country (Vol. 2, p. 670). He thinks a little damage was done crops in the year 1913. He filed a claim and received $40 from the Tennessee Company's fund (Vol. 2, p. 671). For the last three years the crops have been better, and they have threshed more wheat, much more than in his younger days. He has never known the wheat crops to be better. Crops of rye have been good for the last two or three years. He has never known them to be better in North Georgia. Corn crops have been pretty fair. There has never been more corn and other grain raised than during the last two or three years. That section usually buys corn, but during this year (1914) witness does not think any will be shipped in (Vol. 2, p. 672).

R. A. SHIFLETT was for twelve years Chief Mine Inspector for Tennessee, and has made a specialty of examining large boundaries of timber. He was employed by the Ducktown Company to make inspections in North Georgia in 1909 and subsequent years (Vol. 1, p. 469).

In July, 1909, he spent eight days in making a thorough inspection of the timber, and examination of the effect of smoke upon vegetation near the furnaces (Vol. 1, p. 469). At that time the smoke damage extended a little out of Tennessee down to Epworth and the L. &

N. R. R. His next trip was in 1912, beginning September 26th, and he went over a large territory in Fannin, Murray and Gilmer Counties, mostly on the Shippen and Vestal property, and along the head of Cumberland (Tumbling) Creek and East and West of Jacks River and as far South as Cherry Log. The foliage was in good condition (Vol. 1, p. 471). He files a map showing the ownership of the various sections of land. He made a special investigation of the Vestal lands. He noticed evidences of smoke on that trip in one or two places, but the extent of the damage was very slight, and the affected timber was scrubby and of no value, and it covered but little territory (Vol. 1, p. 473). He doesn't think the total area affected was more than five acres, and it was about three miles from the Tennessee Company's plant, and six miles from the Ducktown plant. He made his next inspection in 1913 beginning September 9th. He thinks they were fourteen days on that trip, and six days on another trip in October. Didn't cover a large territory in September. His camp was on Jacks River in Fannin County, and he was over the Vestal property. His work was to make a close examination of the condition of the timber, rather than to cover a large area (Vol. 1, p. 474). He was then about ten and a quarter miles from the Tennessee furnace and thirteen miles from Ducktown, and says there was never any smoke from the furnaces in there. On his trip in October, he saw no evidences of smoke (Vol. 1, p. 475).

On his trips he observed the condition of the fruit trees and crops and found them to be good wherever they had sufficient rain. In 1913 when they had such a drouth he never saw finer vegetables and fruits than there was on Jacks River; and the year before that he never saw finer crops than there were where they camped (Vol. 1, p. 482).

He was on Fighting Town Creek in 1910 off and on from May until September doing some prospecting, but saw no smoke damage anywhere on that creek (Vol. 1, p. 497).

His deposition was taken in Blue Ridge on August 11th, 1914, and he noticed the crops, gardens and foliage of trees as he went along. He saw corn growing within a quarter of a mile of the Ducktown plant right in the Basin and a field across the river from the Tennessee plant. He also saw some gardens which appeared to be green and in good condition. He noticed that the foliage of the trees was green and healthy, and that there were pretty lawns right in the Basin; and he noticed no appearance of injury, everything looking healthy and green. The foliage in Blue Ridge and the gardens appeared to be green and thrifty. He looked around after arriving there, and he was not able to observe any damages whatever arising from smoke fumes there in Blue Ridge, nor had he observed any smoke in the atmosphere (Vol. 1, pp. 484-5).

S. M. BAIN has been full professor of botany in the University of Tennessee since 1901, and is connected with the Government Experiment Station at the University. He has investigated various problems in connection with prevention of plant diseases, and has also made a special study of copper poison on leaves, which extended from 1895 to 1902, and has written a bulletin for the Experiment Station entitled "The Action of Copper on Leaves, With Special Reference to the Injurious Effects of Fungicides on Peach Foliage," which is a standard work upon the subject in this country and in Europe. He has also published a number of scientific papers on related subjects (Vol. 2, pp. 891-3).

He has made a special study of conditions around Ducktown, Tennessee, and in North Georgia, with reference to the effect which the smoke emitted from the furnaces has had on vegetation and forests in those localities. These investigations were made at the instance of the Ducktown Company. He was first employed in September, 1913, and stayed in that section from the 13th until the 22nd of September. He files a map as Exhibit "A" showing his itinerary. They went to Patterson Gap, and down on Jacks River, going up and down the stream, and went across the Tennessee line into Murray County and down to Ellijay. That trip is indicated by red lines on his map (Vol. 2, p. 894). He made a careful study of the conditions of the foliage of trees and vegetation, and collected specimens and made color photographs. He saw no condition of foliage that would indicate any smoke injury, but found some insect injuries and some fungi, but nothing to indicate any damage by sulphur fumes. He found some dead trees, but no unusual number, and he saw no evidence of any other character of disease than those which appear in forests elsewhere. He took as specimens a few leaves of white pine, some of which were injured by insects, some chestnut leaves eaten by red spiders, and some affected chestnut-oak leaves. He found no diseases on the foliage that one could not account for otherwise than by having been produced by smoke. He also took some sections from trees (Vol. 2, pp. 894-5).

He made a second trip from the 4th to the 6th inclusive of October, 1913, and went as far into Georgia as Blue Ridge, about eleven miles from Copper Hill, and made very much the same character of investigation as upon the first trip, and also made some color photographs. He thinks the frost had then fallen, but can't say to what extent it had damaged the foliage. The condition of the foliage was nothing that could not be found in similar regions at the same time of year. He saw no evidence whatever of smoke damage (Vol. 2, pp. 895-6).

From October 17th to 20th, 1913, he made a trip starting from Copper Hill and going to the point where Tumbling Creek crosses the state line, doing the same kind of work that he had done on former trips, but more particularly studying to what extent the growth of timber had been affected by smoke as indicated by the thickness of the annual rings. He also took some photographs showing the condition of vegetation. The leaves were then beginning to change color, but it did not appear to be diseased. He then did not see any evidence of smoke damage on the foliage (Vol. 2, p. 896).

On the 23rd and 24th of January he went up Ocoee (Toccoa) River, but saw no evidence of smoke on the evergreens. Most of his work was then done in taking cores from trees to determine the rate of growth, and he took about twenty-eight specimens from post oak, yellow pine, chestnut, crabapple, black jack, Spanish oak, birch and willow (Vol. 2, p. 897). He made another trip into Georgia on the 8th of June, 1914. He went from Copper Hill to Epworth and returned by the road leading from Rogers Bridge, and made several color photographs along the road and inspected the condition of vegetation and foliage with reference to smoke damage particularly, and collected a few specimens. He made a careful investigation of foliage both going and coming (Vol. 2, p. 897). He made ten color photographs all in Georgia except one of a garden, which is just at the Georgia line. The photographs made on that occasion were:

Ex. No. 1. A view of a garden and house on the road side right at the state line, showing an Irish potato patch.

Ex. No. 2. A general view of gardens in the small valley of Painter Town, about one sixteenth of a mile from the Georgia line, and three miles South of Isabella, and one and one-half miles Southeast of Copper Hill.

Ex. No. 3. A view of another garden in Painter Town showing cabbage, onions, and other vegetables, same distance from the furnaces as No. 2.

Ex. No. 4. View of a garden along the road about one mile and a half from Copper Hill, and about four and one-half miles from Isabella, showing cabbage, onions, beets and other vegetables.

Ex. No. 5. View of forest taken from a road about a mile West of Epworth near Fighting Town Creek showing the growth of forest oaks and other hard wood.

Ex. No. 6. A general view showing landscape taken on the road about a mile West of Fighting Town

Creek and near Mobile Creek, two and one-half miles Southwest of Copper Hill, and about five and one-half from Isabella.

Ex. No. 7. Shows a house and dooryard of J. W. Patterson and condition of vegetation about five miles Southwest of Isabella, and two and one-half miles from Copper Hill.

Ex. No. 8. A view of a garden at the same place, showing beans, Irish potatoes, cabbage, onions, sage, etc.

Ex. No. 9. A general view showing the condition of trees and plants from near a point of the road leading from Copper Hill to Pierceville, two miles West of Copper Hill, and six miles Southwest of Isabella.

Ex. No. 10. A view taken at Rogers' Bridge on Ocoee River, showing a residence three miles West of Copper Hill, and five and one-half miles Southwest of Isabella.

The witness also filed twelve additional photographs, Exhibits 74 to 85, all but three of which show conditions of vegetation, forests, etc., in North Georgia, and those three show conditions in the Ducktown Basin (Vol. 2, pp. 934-7).

On this trip he also made a careful inspection of the foliage, and he says generally speaking its condition was good. He saw some evidence of injury from smoke just at the river bank on the Tennessee side as he understood it. The damage was to beets and potatoes in a garden and also to the leaves of an elder and Jerusalem oak, and it appeared to be comparatively fresh. This was on the afternoon of June the 8th, about four o'clock. He couldn't say whether it was done that day or not (Vol. 2, pp. 899-900). (The date is important, as it is proven that on that day heavy clouds of fumes were emitted from the Tennessee plant).

In Painter Town, where photograph Exhibit No. 3 was taken, he saw some injury to some young shoots of red maple, but he was quite certain it was not due to smoke. He noticed injury to black jack oaks along the road from Copper Hill to Epworth, not far from Epworth, which he thinks was due to smoke and was comparatively fresh. This was about 10 o'clock in the morning (Vol. 2, p. 900). In gardens he occasionally would find potato leaves in a dying condition, and was uncertain as to whether it was due to smoke or some fungi disease, or to drouth (Vol. 2, pp. 900-901).

MR. HAENSELER, an assistant of Prof. Bain's, took cores with an increment borer from fifty-four trees standing along Toccoa River and Wolf and Hothouse Creeks (Vol. 2, pp. 843-4). Prof. Bain examined these cores with particular reference to growth checks, and especially as to whether or not they show improvement in growth in recent years (Vol. 2, p. 930). Out of the 54 cores fifteen showed no checks; on twelve, principally yellow poplar and maple, which are very resistant to sulphur fumes, the rings were too indefinite to read without a microscopic section; seven showed no improvement in the last few years. Of the number that showed no check there were two which showed improvement in 1912 and 1913 and one in 1913 and '14. Thirteen specimens showed improvement during 1912 and '13, five showed improvement in 1911, '12 and '13, and two showed improvement for 1910, '11, '12 and '13 (Vol. 2, p. 932).

For the purpose of illustration a photograph was taken of one of the cores, and was enlarged a hundred and sixty diameters, which is filed as Exhibit No. 73 to Prof. Bain's deposition (Vol. 2, p. 933).

He says he examined a great number of stumps and they showed the same results (Vol. 2, p. 863).

Special attention is called to this evidence of Professor Bain's, not only because of his eminence as a professional man, but because of the very great thoroughness with which his examinations were made, and the truthful and convincing character of his testimony.

DR. J. M. McCANDLESS says he was a member of the first Commission which was appointed to visit the Ducktown section in 1903, and was also a member of the United States Commission appointed in 1905, and after that was sent by the Attorney General of Georgia into that region in 1908 and 1910. The first two commissions were by authority of the Legislature of the State of Georgia (Vol. 2, p. 835). On the first visit the companies were burning ores on roast heaps, and the whole territory was covered by a fog of sulphuric acid, (dioxide) and the air was so full of sulphuric dioxide that the tears would run from their eyes. They drove through the country and observed the conditions as they passed along, and there had been great damage done by the gases which had been carried by the wind into the ridges and foothills in Georgia.

In 1906 the Tennessee Company put in its big stack, which relieved the condition in the immediate vicinity of the stack but extended the area. After the construction of the acid plants there was a marked improvement in the conditions. The first time he noticed it was when he made his trip for the Attorney General in 1908. They drove through the country from Blue Ridge, and observed the situation and vegetation, and asked questions of residents and farmers along the road, and he reported to the Attorney General that there appeared to be marked improvement. He was through the North Georgia section at the instance of the Ducktown Company in September, 1913, with Mr. Gilchrist, and they got off at Ducktown and drove over through the country. There were evidences of gardens being planted in the vicinity of the Ducktown plant, and they noticed along the roads within a mile or a mile and a half around the plant, that residents had successfully made gardens, and there was even a luxuriant growth of vines and grass on the ridge where they spent the night. The wind that night blew the gases towards the house in which they were sleeping, and there was evidently not enough to destroy the grass on that ridge (Vol. 2, p. 837).

(2) *Evidence of witnesses who testified particularly about specific localities*:

(a) *Improvement since* 1907 *and present condition of vegetation in the Ducktown Basin and localities adjacent thereto.*

S. M. BAIN says that near the works there is no native growth, but that as one goes out conditions improve. On his first trip he walked from Isabella to Pack Mountain and picked up on the walk some sixty species, for the most part native plants. He didn't see any injury that he thought was from sulphur fumes except in the case of a Jimpson weed (Vol. 2, p. 908), but he subsequently saw a Jimpson weed growing in Knoxville, which was affected in precisely the same way. He also saw some foliage at the Staff House a quarter of a mile from the furnace, that was a little injured he supposed from the smoke. He made a careful study of the plant life right close to the furnace, and those were the only evidences he found of smoke damage. He has also observed that section every time he went to Ducktown, and has found no evidence of damage (Vol. 2, p. 909).

If the acid plants put in from two to six years ago had taken care of all the poisonous matter, he doesn't think that the tree growth would have returned upon the barren lands, as a tree could make very little growth on account of the conditions of the soil and the burning off of the grass (Vol. 2, p. 910). On his trip in June, 1914, he took a number of photographs showing the grass and trees growing around the homes and in the gardens of that vicinity. These photographs were taken in color, and they show gardens, peach trees, vines, grass and every kind of vegetable that usually grows in gardens and yards in a most flourishing condition. They also show peach orchards laden with peaches that cannot elsewhere be excelled.

Thirty of these photographs are filed as Exhibits Nos. 22 to 51 (Vol. 2, pp. 910-914). They were taken at points of various exposures, and the general aspect of vegetation is faithfully represented by these pictures, it being the witness' intention to give an accurate reproduction of the conditions as they actually existed in the vicinity of the furnace (Vol. 2, p. 914).

Special attention is called to these photographs, as they are equivalent to an actual inspection of the vegetation growing in the immediate vicinity of this defendant's furnace.

PETER S. GILCHRIST says he noticed that the country around the plant was denuded of vegetation, but that wherever anything is planted it grows luxuriantly. The one or two gardens he and Dr. McCandless visited were magnificent. They looked like an oasis in a desert. They were within a mile or a half mile of the furnace (Vol. 2, p. 826).

W. F. NAUGHAN testifies that since the acid plants have been in operation quite a good many people raise gardens, fruit trees, etc., in and around Ducktown. He has seen tomatoes growing in the Ducktown section, and has himself raised as fine peaches as he ever saw grow in North Georgia or any other place. He has had some peaches each year continuously for eight years except one year when they were killed by the frost. He had a splendid crop of peaches in 1913, and his neighbors who lived right around him had gardens which were pretty fair in the year 1914. Two or three men near him had gardens in which were growing beans, cabbage, tomatoes, potatoes, corn and other vegetables. When the open heap roasting was practiced, and up to the time the acid plants were put into operation he is sure there was no living tree in Ducktown Basin, nor could any kind of garden vegetable be grown (Vol. 1, p. 563).

J. M. SENTER lives in Ducktown, and says that since the putting in of the acid plants in 1908 and 1909 the vegetation and timber in the Ducktown Basin is in good condition. Crops of vegetables are raised in the vicinity of Ducktown and in that section. They grow beets, tomatoes, cabbage, beans, onions, radishes and about all the garden vegetables that grow. The witness himself has raised them. Before the acid plants were installed they could not raise anything (Vol. 1, pp. 578-9).

J. H. QUINTRELL lives two miles from the Tennessee plant at a mine that is known as mine No. 20, which is not in operation. Having noticed in the paper that the State of Georgia was asking for an injunction against the companies, claiming that it was killing out all the forests and vegetation, he had five photographs of landscapes taken for the purpose of showing the condition of the growth in that immediate section, which pictures are filed as Exhibits Nos. "1" to "5" to his deposition. Picture No. 1 is of a field which was cleared of timber in 1900, and all the timber there shown has grown since that date (Vol. 2, p. 757). The timber shown in Nos. 2, 3, 4 and 5 has grown since 1903, except some old scrub trees shown in No. 4 (Vol. 2, pp. 757-8).

Pine, maple, white oak and red oak are shown in these pictures; and they fairly represent conditions in that entire section, the witness not selecting the best places. The growth of vegetation was never entirely stopped in that locality, but up until 1909 the smoke came over the timber now and then and turned the leaves brown and stunted its growth, but since 1909, when the acid plants were put in operation, the timber has taken on new life, and is today in as healthy a condition as any timber the witness has found in his travels around the country. During the summer of 1913 he was called five hundred miles from Ducktown to open a copper mine down near the coast, and he travelled in Alabama. In consequence of the claim of damages to timber around Ducktown he noticed timber elsewhere, but he hasn't observed a particle of difference in the condition of the timber in the section immediately around his home and elsewhere, excepting in his section for four or five miles around, there are trees and saplings with dead tops, having started to die before the acid plants were put up, but since the acid plants were put in operation they have put forth new branches, and the bodies of the trees appear to be healthy and growing, while the tops are dead. He has observed no branches that have died in the last few years. This condition is illustrated by some of the saplings and largest trees in the pictures, as in Picture 4, wherein the top of the scrub oak appears to be dead. The witness has farmed a little every year himself, and he and his brothers own a farm a mile and a quarter East of the Tennessee plant, and the wind often travels in the direction of that farm from the furnaces. They have thirty or forty acres there in cultivation. He was through each of the crops several times, except in 1913, and they were all right during the years of 1912 and this year (1914). The timber has not been injured for the last two or three years so far as he can tell (Vol. 2, pp. 759-761). In 1906 the smoke was on the timber shown in the pictures nearly every day (Vol. 2, p. 766).

On cross-examination he states that up to the last two or three years oats could not be raised in that country, but last year he sowed a few acres to see what it would do, and although up until June 1st when he left home the smoke had been carried from the copper company's plant in that direction all summer he could see no effect on them at all. He left the first day of June and took a trip in North Carolina (Vol. 2, p. 864).

W. L. DALTON lives at Copper Hill (Vol. 2, p. 731). When the ore was roasted everything was killed within four or five miles of the plant. After the high stack was constructed the vegetation was not hurt so badly right around the plant, but a lot of damage was done further off (Vol. 2, p. 732). He owns a farm four miles from Copper Hill in Polk County, within one mile of the Georgia line. Before the acid plants were constructed the timber on this farm was hurt badly, all the big timber being killed, and the crops were hurt also. Since the acid plants were installed he has rented his farm, but it has produced good Irish potatoes; and the orchard which was nearly dead has revived and is bearing apples, and new growth is coming out on the trees; and in 1912 he sowed three acres in oats, and raised as good oats as he saw anywhere, although they are easily killed by the fumes. Young herd's grass is still easier, but he is raising some on his place. In the summer time the winds carry the smoke in his direction (Vol. 2, p. 733). For the last four years the smoke has had no effect on the timber in his section. He has seen leaves damaged a little, but the timber apparently is growing as fast as it can. Can't see any difference between its growth and the growth of timber forty miles away. He thinks John Pelfrey has the finest young orchard consisting of from fourteen to sixteen hundred apple trees that he ever saw (Vol. 2, p. 734).

H. A. R. QUINN lives in Ducktown Basin about a mile and a half from the Ducktown plant, and about the same distance from the Georgia line (Vol. 2, p. 740). He works for the Ducktown Company and owns about three hundred and twenty acres of land upon which he lives. This land all lies between the two furnaces. He cultivates a garden around his home in which he raises corn, Irish potatoes, sweet potatoes, cabbage, lettuce, mustard, garden peas, beans and other vegetables that usually grow in a garden.

On Monday and Tuesday (June 8th and 9th, 1914), he noticed signs of sulphur fumes on mustard and lettuce leaves (Vol. 2, p. 741). This smoke came from the Tennessee plant (Vol. 2, p. 742). He noticed no injury by smoke to vegetation at his place during the season of 1914, nor during the year before except on some old gooseberry bushes and some young garden truck. Since the acid plants were installed he has noticed only a little scorching of the leaves. He has an orchard of about three hundred and fifty peach trees, some of them nine years old, and others set out in about 1908. The trees don't look like anything is wrong with them. There were ripe peaches on them when his deposition was taken, and the green peaches were looking nice. The year before he had about one hundred and ten bearing trees from which he sold $130.25 worth of peaches besides what he used and fed to the hogs. He noticed no damage to his orchard in 1913 or 1912, nor since the acid plants have been in operation, and the trees are not subject to insects, although he does not spray them, and there is no defect in the fruit. Prior to the installation of the acid plants he knew of no fruit trees in that section, but there might have been a few. Fruit trees were then killed, but he does not know whether it was by smoke or worms. Young sprouts are now coming up between the furnaces, and broom sedge on which the cattle pasture, grows there (Vol. 2, pp. 733-4).

J. W. PELFREY lives in Fannin County, Georgia, about two and a half miles Southwest from the Tennessee furnace, and knew the country before the acid plants were put in. The smoke then killed the timber and vegetation to some extent. Since the acid plants were constructed it has been a great deal better. He has fifty or sixty peach trees five to eight years old which as a general thing yield a good quality of peaches. He has fifteen hundred apple trees, three hundred of which are bearing, and yield good fruit, except when bothered with drouth. The timber was cut off of a lot about two miles from the Tennessee plant some ten or twelve years ago, and a new growth of timber has sprung up which looks healthy (Vol. 2, p. 615). The crops were reasonably good in 1912 and 1913. They had a little drouth in 1913, and also the present year. In 1912 the fruit crops were extra good. When smelting operations affect the forest enough to kill it, it also affects the fruit trees about the same as other trees. There was no smoke on the leaves in the forests where he lived in 1914; but he had seen a little sign of smoke on vegetation at Fryetown, which is between where the witness lives and the Tennessee plant (Vol. 2, p. 616).

J. C. QUINTRELL lives in Fannin County, about two miles South of the Tennessee Copper Company's plant, and was raised there on a farm. Prior to the establishment of the acid plants nearly all the timber was killed on the farm. The growth would start up but would be killed down each year. Most all the forest timber was killed (Vol. 2, p. 620). Now it has a very nice young growth of timber which has been growing ever since the acid plants were put in. This timber is of different kinds, but principally white oak, and is now two inches and up to three and four inches, and appears to be thrifty and looks well. He can't tell much difference in that and young timber elsewhere. There was a little damage in some of the gardens, but not very many (Vol. 2, p. 621). Between the two furnaces there is a right smart of young black oak and white oak which appears to be thrifty, and sage grass grows between the two furnaces, which is burnt off every year to the injury of young growth (Vol. 2, p. 624).

M. T. FOUTS resides in Polk County, Tennessee, and has been a member of the House of Representatives and also State Senator (Vol. 2, p. 638). He was familiar with the Ducktown section before the acid plants were built. The conditions as to vegetation, crops, gardens and forests have certainly been very much improved since the acid plants were installed. In 1901 there was nothing growing in and around the Basin to amount to anything, not hardly a tree. "Now there are shade trees, gardens, and I saw alfalfa clover growing one hundred yards of the Isabella Company, the other day, something I never saw growing in Polk County. I know some gardens have been there in Ducktown for two or three years." "And the finest peaches I ever saw growing in my life I saw growing in Ducktown last year" (Vol. 2, pp. 641-2).

He has observed the farmers in Fannin County, Georgia, near the Tennessee line growing vegetables, and last year one Mr. Payne had within six or seven miles of Isabella some of the finest apples he ever saw. Since the acid plants were put in the furnaces are not destroying crops and timber in North Georgia (Vol. 2, pp. 641-2).

C. G. BAUGH says that in Pack Mountain three or four miles from the plant the timber is in as good condition, and there is as little dead timber as in any timbered section. West from the Tennessee Company there is a lot of dead timber. When one gets further back it is better, but after one goes three or four miles from the plant the quantity of dead timber does not increase (Vol. 2, pp., 690-1).

G. C. PARKS has lived in Ducktown for four years from 1906 (Vol. 1, p. 586). He says that when the tall stack was put up the smoke zone was greatly increased. Since the acid plants were put in operation the smoke seems not to affect the crops around Ducktown to amount to anything. He makes good truck there, and he set out some fruit trees, and had some very nice peaches growing on them, and there was a fine lot of peaches all through the Basin (Vol. 1, pp. 588-9).

W. G. PAYNE lives in Cherokee County, North Carolina, and owns over two hundred acres of land, some within three or four miles of the Ducktown Company's plant, and he raises corn, rye, oats, potatoes, fruits and other crops of like character. Neither his crops nor timber has been damaged by the operation of the copper companies (Vol. 2, p. 707).

W. M. STEPP lives at Epworth, three or three and one-half miles air line from the Tennessee plant, and seven or eight miles from Ducktown furnace. He was living at Epworth when the acid plants were installed (Vol. 2, p. 605). Before that everything was scorched up pretty badly there by the sulphur fumes, and about one-fourth of the timber was killed. It killed oak and pine. Since the acid plants were established it hasn't done very much damage, but some has been done when something has been the matter with the Tennessee plant, which has happened once in a while. Witness has been around the store and can tell when something happens at the Tennessee furnace, and it is that furnace to which reference is had when he speaks of something happening. He can see that furnace from a ridge at Epworth. Since the establishment of the acid plants the timber in North Georgia, particularly around Epworth, "is coming out fine;" "is looking well. It is green and nice." If there is any damage done to it at all it is mighty little. Can't tell that any timber has been killed since the acid plants were built. The old timber looks a great deal better and has come out a right smart.

He noticed no damage to timber at all last year, and but very little to the vegetation. He made a garden and if it was damaged he did not know it. He doesn't think it was damaged in 1912 to amount to anything. There might have been a few plants hurt (Vol. 2, pp. 606-7). He doesn't think timber has been injured since the acid plants were put in to amount to anything (Vol. 2, p. 610).

(b) *Improvement since* 1907 *and the present condition of vegetation in and around Mineral Bluff.*

R. T. HAMPTON lives at Mineral Bluff about six miles from the Tennessee plant and about ten from the Ducktown plant. He says the most injuries there were during the two or three years after the high stack was constructed—in 1906, '07 and '08. It was not near so bad before. There were times when the smoke was so strong it would make one cough, and when it cleared away, the little leaves on the vegetables and timber would turn brown, and the tender twigs and young vegetation would parch up like a fire had run over it. He supposes it was the cause of a good deal of timber dying. It was hard on tomatoes, potatoes and peas. Since the construction of the acid plants he has not seen any effect at all on the leaves and trees. The Irish potatoes were not good in 1914, but he thinks it was on account of the drouth. He hasn't noticed any smoke over there. He couldn't say it damaged anything in 1913. He noticed no damage to timber or vegetation in that section in that year, and didn't see any during the year 1912. He hasn't seen any damage there since the acid plants were constructed. In 1906, '07 and '08 the leaves on the timber were burned brown, just like there was quite a frost, and from a great many trees the leaves would fall by the first of September, but that isn't seen since the acid plants were constructed. Trees stay green up until the frost kills them. He has had four acres of corn cultivated for about six years, and makes about fifty bushels to the acre. He has noticed no injury to the corn that he could tell, and no more dead leaves on the trees than on trees fifty miles away. He does business with a great many men and rides over Fannin County to see different parties, and in places formerly barren young trees are growing and shrubbery coming up (Vol. 2, pp. 651-3).

W. T. S. DICKEY lives at Mineral Bluff, and has a small farm and is a contractor. He says before the acid plants were constructed there was a great deal of damage from smoke. The timber would be burnt along on the side of the mountains, and it would injure the vegetation and crops more or less. The leaves would brown and look like they had frost on them and would fall off. The timber would die he thinks from the effects of smoke. One could smell the smoke. For the last two or three years according to his observation he cannot see that the smoke is doing damage to vegetation around where he lives. He has noticed along the roads towards Murphy and by Grainger and down to Atlanta and to Ducktown, but has noticed no damage during the season of 1914. However, he saw some smoke in there on Monday, the week before (June 8th, 1914), but there wasn't enough to be unpleasant, and he noticed no bad effect on the vegetation. He observed no injury to the vegetation during the year 1913, and remembers of none in 1912. He has seen rye growing in the neighborhood during the season of 1914, and considering the land it is the best he ever saw (Vol. 2, pp. 656-9).

J. F. McNELLY lives at Mineral Bluff, and sells fertilizer in Fannin, Gilmer and Union Counties. After the erection of the high stack the smoke seemed to affect the timber, the vegetation and the crops (Vol. 2, p. 662), and seemed to extend over half of Gilmer County (Vol. 2, p. 663). He remembers the installation of the acid plants, and he has noticed no damage to the timber or to vegetation through that section from smoke in the present year (1914) (Vol. 2, p. 663). He noticed a little damage in July of the year 1913—two or three times leaves being a little bit browned, but he doesn't think that was sufficient to do any damage to the timber. He noticed no damage last year to garden vegetables or fields. The year before he noticed a little damage two or three times during the season, but doesn't think it did any damage to the timber (Vol. 2, p. 654). Since the installation of the acid plants the condition has been considerably better. Through the sections he has traveled he observed during the years 1911, 1912 and 1913 just a little effect from the smoke on vegetation and on the leaves of the forest, but doesn't think there has been enough to do any appreciable damage (Vol. 2, p. 665).

TOM CURTIS lives a mile and a half from Mineral Bluff and has farmed all of his life. He says that after the tall stack was built it was pretty bad at times. A good many leaves were killed and some timber through that country (Vol. 2, p. 670). It has been getting better about three years. He does not think there has been any damage during the year 1914. Smoke was in there in the spring, about the 6th and 7th of June, and some in May. In the year 1913 it looked like vegetation was damaged a little, and the witness put in a claim and got $40.00 (Vol. 2, pp. 670-1).

P. T. WILLIAMS lives near Mineral Bluff. After the high stack was put up by the Tennessee Company the leaves on the timber were killed, and the corn would be small and chaffy. He hasn't noticed any damage during the year 1914 to the forests or vegetation. He has seen some apple trees from which the fruit dropped off, but they had some heavy frost in the spring, and a drouth in the month of May. He has noticed no signs of sulphur fumes on the leaves, but did notice some potato tops scorched, but did not know whether it was from dry weather or smoke. In 1913 in the Fall he saw some corn tassels dried up, but the corn had a good sized ear (Vol. 2, pp. 676-7).

C. G. BAUGH lives at Mineral Bluff, and has been acquainted with that section for forty years. The erection of the high stack by the Tennessee Company had a bad effect apparently, so far as timber and vegetation was concerned; but since the construction of the acid plants he can't say that any serious damage has been done (Vol. 2, pp. 685-6).

R. L. TURNER lives a mile and a quarter from Mineral Bluff and is a farmer. He says after the high stack was first put up in that section they were troubled a right smart with smoke, but since the acid plants were put in, he can't see very much damage. The condition of crops is fair in 1914, but they had an unusual drouth of six weeks, and he thinks they had some heavy May frost, which generally affects the fruit crop (Vol. 2, pp. 693-4).

G. P. DICKEY resides at Mineral Bluff, is a merchant, and represented Fannin County in the Legislature in 1912, when he canvassed the county (Vol. 2, p. 747). He saw very little evidence of smoke damage around Mineral Bluff in 1913. In 1910 it was pretty bad, but nothing like it was before. In 1911 it was better, and continued to improve in 1912 and 1913. This year (1914) the foliage is as pretty as he ever saw it. Last year (1913) he saw no evidence of injury sufficient to damage timber. He looked over his timber to see whether it was injured enough to put in a claim and decided that it was not. He owns more than three hundred acres of land well timbered. There was some damage to this timber in 1910, and less in 1911 (Vol. 2, p. 749). There is a good deal of rye, and it is said that it is the best crop they had ever had. Rye is a tender plant and is susceptible to smoke fumes. There was a good crop of rye last year (1913), and it is better this year. He has traveled from his own home to his place near Copper Hill and down the North Carolina line, and has been over to Blue Ridge, and from there down to Copper Hill, but has noticed no evidence of injury in that entire section during the present year (1914), and saw no evidence of injury sufficient to do real damage during the last year. He then had a good garden and raised some fine potatoes, cabbage, beans and stuff of that kind (Vol. 2, p. 750).

M. D. RICHARDS in 1913 lived in Fannin County, Georgia, about twelve miles from Copper Hill. He grew that year corn, peas, beans, tomatoes and garden truck and raised a good crop, the best that was ever raised on the place. He didn't consider that his crop was damaged any from sulphur fumes, but a little from dry weather. He was back and forth to Copper Hill and found the forests and crops in a reasonably good condition, like they were at his place, all the way through (Vol. 2, pp. 700-701).

(c) *Improvement since* 1907 *and present condition of vegetation in the vicinity of Morganton.*

T. A. BYERS lives near Morganton ten or eleven miles direct course from Copper Hill. He says after the high stack of the Tennessee Company was put in and before the acid plant was constructed the smoke affected that section. The leaves of the timber would crisp up and turn brown. After the acid plants were constructed no sign of the smoke could be seen. If there is any damage being done to his section he cannot tell it. He is engaged in truck farming and farming and hauls his truck to Ducktown, and has been so engaged for about fifteen years with the exception of three. He has truck farmed for the last four or five years, and grows onions, cabbage, peaches, beans and tomatoes. Last year he and his uncle had in vegetables an acre or an acre and a half. They kept no books, but they realized from $500.00 to $1,000.00. They had in about the same amount the year before and realized about the same sum. During the year 1914 they had about eight acres in corn and an acre and a half or two acres in truck, and when his deposition was taken June 19th, 1914, he had hauled eight or nine loads from his place. He makes more off tomatoes than anything else. No damage had been done in that section during the years 1914 and 1913 that he could tell (Vol. 2, pp. 679-81).

GRANT ORTEN lives in Morganton and farms. He says if there has been any damage from smoke he has never noticed it. The crops for the year 1914 are the best he has ever seen on Start Creek (Vol. 2, pp. 1063-4).

T. E. GARREN lives in the Morganton District and his business is farming. He is acquainted with the Dora, Mineral Bluff, Start Creek and Morganton Districts, and says that the corn, peas and bean crops for 1914 are all good. He has been out eight or nine miles from his home up the Toccoa River (Vol. 2, pp. 1067-8).

J. C. ADDINGTON lives one mile East of Morganton, and about thirteen miles air line from Copper Hill. He has been farming at that place since 1909 and cultivates forty acres. When he began it was grown up in sassafras sprouts and blackberries with the exception of a few little patches. In the year 1913 he had four or five acres in corn upon which he made about three hundred bushels. Upon one acre he produced one hundred and thirty-six bushels and fifty-two pounds for which he received the premium for the best acre of upland corn in the state. He raised also a crop of Irish potatoes on two or three acres which ran a hundred and eighty-nine bushels to the acre, and he followed the potatoes with corn and made seventy-five bushels of corn to the acre. He made these crops though the season was sufficiently dry to injure them. When he first began he noticed some effects of sulphur smoke in certain places (Vol. 2, pp. 878-880), but during the present year he has noticed no signs of smoke in that vicinity, and has seen nothing in his crops that he could ascribe to smoke. He noticed some signs of injury to leaves either the year 1913 or '12. He had cut his wheat when his evidence was taken, and he thinks it produced about fifty bushels to the acre, and files a few heads as an exhibit (Vol. 2, p. 881). He identifies a picture, which appears on page 14 of a pamphlet styled 1914 Year Book, published by the Morris Fertilizer Company, as a picture of his prize acre of corn (Vol. 2, p. 882).

He sent other pictures at the same time to the company and wrote them a letter in which he stated that Pictures Nos. 1 and 2 show a piece of corn that would make about a hundred and fifty bushels to the acre, and if there had been rain it would have made two hundred, and might do it any way. No mention was made in this letter of any damage from smoke fumes, and he says the statements in the letter were correct (Vol. 2, p. 882).

However, Mr. Addington presented a statement to the Board which distributed the Tennessee Copper Company's fund, claiming that he had been damaged in the season of 1913 about $800.00, half of which he attributed to sulphur fumes (Vol. 2, p. 887), and the Commission allowed him $15.00 (Vol. 2, p. 884).

The foregoing is the substance of the evidence introduced in chief by defendant. It relates very largely to conditions existing immediately around the furnaces and in nearby vicinities, and other localities which would most likely be affected by escaping fumes. To this is added considerable evidence of general conditions through North Georgia given by witnesses of whom, some have made special investigations, and others have had special opportunities to know the facts. This evidence, with the exception of one witness, was taken in Chattanooga and Knoxville from June 18th to 26th, 1914. Plaintiff thereafter took its evidence at Blue Ridge, Georgia, from August 12th to 21st, 1914.

**2nd. Plaintiff's evidence as to injuries to vegetation by smoke fumes, and defendant's evidence in rebuttal.**

There are two circumstances with reference to plaintiff's evidence which merit special attention: First, plaintiff does not attempt to refute defendant's evidence relating to conditions in the Ducktown Basin. It is not denied that up to the construction of the acid plants this section which immediately surrounds the furnaces was largely denuded of vegetable growth, and that it was impossible to produce there a garden or any kind of crop, or for a forest tree to there exist. While there is a place near the furnaces which remains denuded because the soil is washed away and all vegetable seeds were destroyed, yet that the smoke from the furnaces does not prevent vegetable growth there is demonstrated beyond all question, not only by many witnesses who reside there and actually grow fruits and vegetables, but by color photographs which re-produce these orchards, gardens and lawns in open court. This, however, is passed over in almost complete silence in plaintiff's testimony.

The second circumstance is that plaintiff's evidence was taken at Blue Ridge, a point a little East of South from the furnaces situated in a gap of the mountains and hardly half the distance from the furnaces to localities in which much damage is claimed to have been done during the year 1914, and in a direct line between the furnaces and such localities. Furthermore, it was proven and not denied that prior to the construction of the acid plants the entire section around Blue Ridge was badly scorched by the smoke. Yet, although parts of two weeks were spent there in taking proof, not a word was introduced by plaintiff with reference to any smoke injury there existing, though time and again the attention of witnesses was called to the condition of vegetation and of the foliage on trees in the immediate vicinity of the Court House in which they were examined.

Plaintiff's evidence relates almost entirely to the following sections of the country:

(1) *Epworth, Fighting Town Creek, Madola, Pierceville, Barnes Mountain, Granny Marr Mountain, Mule Top Mountain, Higdon's Store, Little Fighting Town Creek, Tumbling Creek, Jacks River, Patterson Branch, Adams.*

These several points and localities lie Southwest of the furnaces, extending from Epworth, which is but three or four miles distant from Copper Hill, to Jacks River section and the head waters of Fighting Town Creek, probably twelve or fifteen miles distant.

### *Plaintiff's Evidence.*

Plaintiff examined the following witnesses with reference to these places and localities:

DR. HEDGECOCK took a flying visit in an automobile through some of these places a few days before his deposition was taken. He passed through Epworth, Madola, and was on Barnes and Granny Marr Mountains, and took thirty-seven specimens from Granny Marr Mountain, Barnes Mountain, in and near Epworth, and along the road between Blue Ridge and Copper Hill, which he files as exhibits, and which he claims show evidence of smoke injury. He says they observed injury near Epworth and extending at various points along the road from Epworth to Madola, and beyond Madola at a number of points to Barnes Mountain, and on Barnes Mountain there was abundant injury, and from there it could be seen with a field glass on Mule Top. In some places the injury was recent and in others probably it occurred two months ago (Vol. 1, pp. 6-9).

This witness is a plant pathologist in the employ of the United States Government, and it is to be presumed that he and the witnesses Clark and Johnson, who are Government foresters, appear as witnesses on behalf of the plaintiff because the United States Government is purchasing large bodies of lands in North Georgia and East Tennessee, some of which approach as near as four or five miles to these plants (Vol. 1, p. 59.)

He testifies at length about his experience in looking through forests which have been affected by smoke fumes in Arizona, California and Montana, and discourses learnedly upon the different zones existing around copper plants. But when taken as a whole, it clearly appears that his evidence it not reliable. He assumes an attitude of antagonism to the defendant, and is often not reasonable in his statements. He can tell practically nothing about the capacity of the furnaces he visited in the West, or how they are operated, or whether they extract any of the poisonous fumes from the smoke (Vol. 1, pp. 20-21.) Therefore his experience there is of but little value. He knows nothing about either the Tennessee or Ducktown plants (Vol. 1, pp 22 and 28.) Although he went through Ducktown he will not admit that he saw any gardens containing beans, peas, radishes and things of that kind, or anything more than a three by four patch. He claims he saw some corn patches and grass that looked sickly; but didn't see any peach orchards. He says, however, that he went through rapidly in an automobile; was afraid they were violating the speed law, and pretty near ran over a horse, being in a hurry to get back to Blue Ridge to get dinner (Vol. 1, pp. 23-24.) He won't answer frankly that if fine peach crops are as regularly produced near the furnace as elsewhere in the country such fact is an indication that there are no damages from smoke during the blooming season of the peach tree (Vol. 1, p. 33.) He won't answer definitely what he would conclude if he found good corn, oat, wheat and rye fields in the neighborhood (Vol. 1, p. 34.) On one of his trips he says he made no special observation of crops, more than a blackberry twig (Q. 236, Vol. 1, p. 35.) He didn't look at anything except the beans and blackberry bush in the garden where the specimen taken from the blackberry bush was found (Vol. 1, p. 36); and that was the only garden he looked into; and he didn't pay any attention to the corn fields (Vol. 1, pp. 35-6). But he admits that forest fires have damaged the forests in North Georgia (Vol. 1, p. 37).

His deposition was taken in Blue Ridge, and he was asked to look out from the window, and see whether there was any evidence whatever of damage from smelter fumes there, but refused to do so. He admitted that there were leaves within thirty feet of him, but he claimed that *one* was dry, and slightly yellow, not as green as it might be, and that very probably it was injured by smoke. He claimed to have seen a slight yellowing of leaves in Blue Ridge, but admitted it was not a good type of even chronic injury, and that there was no acute injury there. He was told that if he would turn his eyes he could see some peach trees, but he refused to do it unless ordered by the Court. He also refused to look at some corn nearby, because it was undignified and unprofessional, and inaccurate. He was told that he could see various kinds of vegetation if he would but look, but he refused to look (Vol. 1, pp. 38-39).

When the views of scientists are called to his attention he professes to think but little of them, and does not recognize the authority of any one, or agree with anybody altogether (Vol. 1, pp. 52-54).

A comparison is invited between the kind of examination of the forests and vegetation in general made by this witness and also the inherent character of his testimony, and the very extensive, painstaking and careful research and experiments made by Professor Bain, of the University of Tennessee, and his dignified and perfectly frank and fair manner of testifying. After he was first examined this witness made another trip to Flat Top Mountain and on Big Frog, which is West of the copper plants, and extends across the State line, and he claims to have seen smoke injury on Big Frog Mountain (Vol. 1, p. 443).

H. L. JOHNSON and E. B. CLARK, young foresters, accompanied Dr. Hedgecock on his several trips and more or less corroborate him as to what was observed, although they have but little knowledge of smoke injuries (Vol. 1, pp. 55-8, 302-6 and 429). The attitude of these witnesses was very similar to that of their superior, Dr. Hedgecock. Mr. Clark in substance admitted that they were not looking for vegetation that was not injured, but had their attention fixed solely upon injury (Vol. 1, Qs. 151-154, p. 317). When recalled he claims to have found more pronounced injury on Flat Top Mountain and Young Cane, in Union County, about twenty-one miles from the Copper Hill plant (Vol.

1, p. 429). This shows the absurdity of his entire testimony, as it is not believed possible for there to be any smoke damage of consequence in the forests at that distance from the furnaces.

A. E. SHARPE, who for ten years has been woodsman for the Shippen Lumber Company (Vol. 1, p. 134), says that in getting up testimony for the State in this case he has traveled over a large part of Fannin and Gilmer Counties. A week or two before his deposition was taken he made a trip on Barnes Mountain and Jacks River and Granny Marr Mountain and in the Fighting Town Creek country, and says that he found some sections not affected this year which have been heretofore affected, and that to the Southwest of Blue Ridge, on Barnes Mountain and from there back North into Granny Marr there was damage (Vol. 1, p. 139).

J. P. VESTAL owns twelve thousand acres of land in person and three thousand in connection with his son (Vol. 1, p. 175), and had a case against the Ducktown Company for damages which was tried during the first part of May, 1913, in the Federal Court at Chattanooga when there was a mistrial, and was again tried, when the jury rendered a verdict against him (Vol. 1, p. 173). He tells of the presence of smoke in that section at different times during the year 1914 and especially on the 8th and 9th of June, and describes smoke damage to forests which he saw when along with Dr. Hedgecock (Vol. 1, pp. 166-169).

T. R. HARKINS lives on Jacks River (Vol 1, p. 235). He says crops are reasonably good this year (1914) (Vol. 1, Q. 17, p. 236), and that the injury this year is bad on Barnes Mountain and on Blue Ridge, but doesn't think it was so bad last year (Vol. 1, p. 237). This witness came ten, eleven or twelve miles through forests to give evidence, and when asked if the forests through which he passed were not in a healthy condition he says it is some greener this year, and can't positively state as to its condition (Vol. 1, Q. 19, p. 239). He has under consideration the filing of a claim with the distributors of the Tennessee Copper Company fund (Vol. 1, p. 240), and has been an employee of Vestal (Vol. 1, pp. 241-2).

W. M. BARNES lives at the foot of Barnes Mountain (Vol. 1, p. 257). He has seen smoke in there this year and for many years and describes its effect upon the timber (Vol. 1, p. 257), and says it wasn't so bad last year as this (Vol. 1, p. 258).

B. F. WEEKS, who is Post Master at Epworth (Vol. 1, p. 352), claims to have noticed injury around that place, but says they had a very dry season, which he thinks had some effect on the potatoes and garden truck (Vol. 1, p. 353). He has a very fine oak grove at Epworth, but thinks he saw some signs of smoke injury on it, but not as much this year (1914) as before (Vol. 1, p. 356).

J. G. ADAMS, a photographer from Atlanta, took a number of photographs of landscapes in this section, to which and to defendant's photographs relating to the same places special attention will be hereafter given.

## *Evidence in Rebuttal.*

Defendant introduced the following evidence relating to this general section in rebuttal to the testimony introduced:

W. T. HIGDON lives at Higdon's Store and is Post Master. He owns a hundred and sixty acres of land and has farmed there since 1889. He says there was some smoke in that locality about the 8th and 9th of June, 1914, from which resulted slight damage. He has worked in the crops but has not noticed that they were injured at any other time during the year (Vol. 2, p. 1125). He has noticed no damage to forests during the season except they have had an unusually dry year, the worst in twenty-six years. Some trees died, but he thinks it was from the drouth, which extended through May and June and up to the first of July (Vol. 2, p. 1126).

J. S. DAVIS lives on Jacks River and farms, and owns an orchard. He says he has good corn the present year (1914). If any damage has been done by smoke during the year he has not seen it. He is familiar with the country up and down Jacks River for several miles, and has been all through the country, and if there has been anything like smoke injury to vegetation he has not been able to find it (Vol. 2, pp. 1039-40).

W. T. POSTELL lives near Flat Mountain and has been on the mountain half a dozen times during the season of 1914, and has seen no damage that he thought was from smoke. He is a farmer and cannot tell that there has been any damage to his crops, and has seen no damage from smoke in his neighborhood (Vol. 2, p. 1128).

G. M. PANHORST, Chief Clerk of the Tennessee Copper Company, was introduced by plaintiff to prove that on certain days the Tennessee plant was not in operation.

On cross-examination he testified that he has been through Epworth, Madola and Pierceville, and on Fighting Town Creek, and that the forests and vegetation look good, and that he has noticed no apparent effects from sulphur fumes through that whole stretch of country (Vol. 1, p. 227), and that they had a bad drouth which was broken on the 4th of July (Vol. 1, p. 229). In taking proof in chief, a number of witnesses, whose residence has heretofore been stated, testified about this section, and it will be further considered in discussing the photographs on file.

(2) *Ellijay, Yukon, Turnip Town, Mountain Creek, Carter Cay and other points in Ellijay region.*

### *Plaintiff's Evidence.*

Notwithstanding the great distance of this section from the furnaces, the greatest number of witnesses testify with reference to injuries in and about these several localities. This is doubtless because the Shippens live at Ellijay, and the Shippen Lumber Company owns the larger part of that territory.

The several witnesses who testify for plaintiff are: JAMES F. TEEM (Vol. 1, pp. 69-74), who has filed a claim for $400.00 with the Tennessee Copper Company Fund Commission (Vol. 1, p. 78); J. H. CLONTS, who has filed a claim for $100.00 a year for sixteen years (Vol. 1, pp. 79-82 and 88); C. S. NORTHCUTT, who looks after the Northcutt orchard, which contains sixty-five hundred trees (Vol. 1, pp. 93-4), and who admits that there is San Jose scale in the orchard (Vol. 1, p. 95) and that the effect of candle moth upon trees is similar to that of smoke (Vol. 1, p. 97); ASBURY HINSON, who has overseen for many years the Arnold orchard, which contains nine thousand and sixty trees (Vol. 1, pp. 98-99), and who says that the only damage he has noticed, except some damage from three to five weeks ago to corn silks, was on the 8th and 9th of June (Vol. 1, p. 104), and admits that there is some San Jose scale in the Arnold orchard (Vol. 1, p. 105); W. A. PAINTER (Vol. 1, p. 108-109); W. S. HINSON (Vol. 1, pp. 114-116); GEORGE HINSON (Vol. 1, pp. 118-119); J. M. WITHROW (Vol 1, pp. 128-131, 133); A. E. SHARPE (Vol. 1, pp. 134, 141-153); T. S. JOHNSON (Vol. 1, pp. 186-7); J. G. DeWEESE (Vol. 1, pp. 346-9); and W. H. SHIPPEN (Vol. 1, pp. 317, et seq.), and FRANK E. SHIPPEN (Vol. 1, pp. 395, et seq.), President and Vice-President, respectively, of the Shippen Lumber Company. This Lumber Company is the owner of a hundred and eight thousand acres of timber in North Georgia, and in order to understand the animus of these two witnesses it is necessary to read their testimony in full. Consideration will be hereafter given to their connection with the instigation and prosecution of this case.

W. H. SHIPPEN helped to procure the witnesses and was present advising with plaintiff's attorneys a great part of the time the evidence was being taken (Vol. 1, p. 330), and contrary to the testimony of all other witnesses introduced by plaintiff, except possibly Frank E. Shippen, he testifies that he can not see much difference in the condition of the forests now and before the acid plants were constructed; "if anything, I think it is worse, because the injury has been applied longer" (Vol. 1, Q. 143, p. 340).

FRANK E. SHIPPEN claims that he from May 1st to the date of taking plaintiff's testimony, kept a diary which shows the several dates upon which smoke appeared at different points in that general section, and he names fourteen days in May, thirteen days in June, fifteen days in July and nine days in August up to the sixteenth of the month (Vol. 1, pp. 395-7). No other witness in this respect makes claims anything like so extravagant.

DR. HEDGECOCK and Foresters CLARK and JOHNSON also made a brief visit through that section, but say but little about injuries they found there.

While many of plaintiff's witnesses testify as to the appearance of smoke in that section, yet but few of them claim that any *great* damage has for the last few years been done to the forests, confining it mostly to injury from time to time to some particular kind of vegetables or crop; but especial emphasis was made by some of the witnesses on alleged injuries to the Northcutt and Arnold orchards and a few small orchards in the same neighborhood.

### *Plaintiff's Evidence in Rebuttal.*

As these localities were all remote from the furnaces and as that part of the intervening territory which lies near the furnaces had been given special attention in defendant's testimony in chief, but little consideration was then given to this section; but in rebuttal defendant introduced the following evidence:

W. P. HARPER is cattle inspector for Gilmer County, and as such has been in the woods a great deal and through different parts of the mountains, and has passed by many fields and orchards. He says that during the year 1914 there was very little damage, and the crops in Gilmer County were very fine, much better than common, though there had been some dry weather (Vol. 2, pp. 1029-31). He was read the testimony of Frank E. Shippen, wherein he detailed the dates upon which he claims smoke had appeared at the points mentioned, and the witness stated that he had seen nothing approaching such conditions, and had seen the smoke down there but very little during the year (Vol. 2, pp. 1032-3).

B. H. HOLT lives at Blue Ridge, but has traveled in and around Ellijay and in Carter Cay Valley. He made a trip through there about the 8th of September, when pictures were taken of representative places, spending about twenty-one and one-half days on the trip, and he examined various kinds of crops (Vol. 2, pp. 1091-2). He says that he saw no damage to the forests on the whole trip except a place which was close to Barnes Mountain. In the Ellijay section and Carter Cay Valley, and on Turnip Town Mountain and Bushy Head Mountain he detected no smoke injuries, and there was no injury to the growing crops that he could tell, but they were considerably better than usual. He has never seen a better crop in those vicinities, though he is forty-five years old and has known that section all of his life (Vol. 2, p. 1093).

HAM HOLT is a salesman and travels through Gilmer County and other parts of North Georgia, and says that the crops in that country for the year 1914 are the best that have ever been raised in North Georgia (Vol. 2, p. 1044).

J. C. AIKENS has lived in Gilmer County for thirty-six years, near Stovall, and is familiar with Turnip Town Mountain and Carter Cay Valley. He has given attention to vegetation and forests in that section of country (Vol. 2, p. 1109). He worked with Mr. Quintrell for defendant about the first of September and went through a large section of that mountain country, and noticed the timber and crops pretty carefully, and knows the whole territory through Gilmer County. He saw no signs at all of damage from smoke on the trip. On his land the crops are (1914) as good as he ever saw them, though they were injured early in the summer by drouth. The gardens he saw were doing fine, and there was no appearance of smoke injury to them or to any of the crops. Some orchards were full of fruit, and he saw no sign of smoke injury on fruit trees. He made an examination of the forests and crops around the land of Mr. Teem and Mr. Evans, who were witnesses for the plaintiff, and does not think he saw any evidences of smoke injury there, but Mr. Evans had a patch of corn that had the rot, or something like smut. Witness did not know what it was (Vol. 2, pp. 1110-1111).

M. S. CLAYTON lives four miles East of Ellijay and has noticed the crops through that section, and says they are good, a great deal better than common. He has observed no signs of smoke injury to them. He has been about Ellijay and has given attention to the crops there and says they are in good condition, so far as he noticed. He saw no signs of smoke damage (Vol. 2, pp. 1115-17). He went with Mr. Aikens and others through parts of Gilmer County to the Fannin County line. They traveled ten days and averaged twenty or twenty-five miles a day. He saw no evidence of smoke either to the forests or crops on the trip. In 1913 he made observations through the forests in seven Districts of the county. He was forty-six or seven days on the trip and gave careful attention to the forests, and the only smoke damage he saw was a little about Epworth School Building (Vol. 2, pp. 1118-1120).

T. N. BENNETT lives one mile North of Ellijay, owns a farm and is acquainted with the Ellijay River Valley for a distance of eighteen or twenty miles. He says if there was any damage done through that section in 1914 he could not discover it. It might have been possible that the smoke could have scorched in there a little, but he never saw it. He never noticed any smoke there at all and did not smell any (Vol. 2, p. 1037).

J. W. CLAYTON lived in Atlanta but owns a farm in Gilmer County, about five miles East of Ellajay, and has been there almost constantly for the last three years. He has to some extent observed the forests in that section for the purpose of determining whether or not there has been any smoke injury through there during the season of 1914, and there has been none that he could see. He has seen nothing the matter with the foliage. He detected no injury except occasionally he would see a tree with the foliage on the under side apparently dying early in the season, just as one would see in going elsewhere through the woods. They had considerable trouble there in the spring (Vol. 2, pp. 1055-6).

A. N. JOHNSON has lived in East Ellijay for twenty-four years and was over a portion of Carter Cay Valley during the summer. He was constructing buildings in different parts of the county but was at home till the middle of June. He lives half a mile from Frank E. Shippen, and his business requires him to travel around Ellijay. He can see a part of Turnip Town Mountain and has seen Bushy Head Mountain and Flat Top Mountain frequently. He has seen nothing during the year (1914) that he considers to be smoke injury. The corn fields are better than usual, and there is quite a quantity of corn and apples, though they had a pretty bad drouth up till the middle of the spring. He has seen no discoloration on the leaves during the year in Gilmer County. He has occasionally seen some smoke in the county, but has not seen smoke of much consequence in Ellijay Valley. He has noticed no injury around Ellijay that he thought was due to smoke (Vol. 2, pp. 1103-4).

He was read what purported to be an interview with a gentleman not living in that section, which appeared in the Atlanta Constitution dated October 27th, and which concludes:

"I have been pretty well over both counties, and

> have heard no word of hard times. On the other hand, I have seen unlimited signs of prosperity. The answer to this, of course, is that they raise no cotton but do raise things for which there is always a ready market, and which they can consume at home. The lesson of Gilmer and Fannin Counties is a striking one at the present time,"

and he testifies that he is acquainted with the general condition of the two counties and that the conditions described in the article there prevail (Vol. 2, pp. 1105-6).

J. W. CLAYTON testified with reference to the damage to the Arnold and Northcutt orchards that his principal business in Gilmer County is growing an orchard; he has about four thousand trees, principally apples. Northcutt's orchard is about a mile and a half West of his, and Arnold's is about the same distance but North of Northcutt's. Those three are the commercial orchards in that vicinity. His orchard is eleven years old, and he has given special attention to it. He has seen no damage in his orchard that he could attribute to the smoke. He has some crops and a garden and his vegetation has not been injured by fumes as he could tell. He has had a better fruit crop during the year than usual. If the apples have been damaged in any way he does not know it, except there are some diseases which he did not entirely control by spraying. He constantly reads bulletins from the Experiment Station written by the leading horticulturists of both the Government and his and other states, and has also made observations of the orchards and experimented with his own trees. He was in a portion of Northcutt's orchard four or five weeks before his deposition was taken (November 6th, 1914). He was asked to make the inspection for the defendant by Mr. Reese. He examined it pretty closely. The trees lacked cultivation. The orchard was in a pretty bad condition. It had a considerable amount of leaf spot, or Frog Eye, as it is called, which is caused by a parasite that attacks the foliage. Both Northcutt's and Arnold's orchards had been cultivated very poorly. They had grown up in weeds as high as one's head. He found some scale in both orchards, but didn't notice it was affecting the trees and fruit very materially. It takes the scale about two years to kill the tree. He did not examine the Northcutt orchard enough to notice it. He also noticed fungi diseases on the fruit, or some black rot and bitter rot, and also a kind of sooty fungus, and some blotch that injures the apples and prevents them from developing. He can't say that he saw any evidence whatever in either of the orchards of injury from smoke fumes. He is not familiar with smoke damage, but did not see anything more than he could account for from other causes.

In 1913 he had six varieties of apples on competitive exhibition at the New York State College at Utica, Cornell University, there being exhibitors from all over the United States, and he took four first premiums and two seconds (Vol. 2, pp. 1050-55).

M. S. CLAYTON also examined the Arnold and Northcutt orchards in 1914 at the instance of Mr. Reese. He has been putting out orchards for the last twenty-five years, and he corroborates J. W. Clayton as to the condition of the two orchards, and says he found no evidence in either Arnold's or Northcutt's orchard of injury from smoke (Vol. 2, pp. 1115-17).

B. H. HOLT, who had charge of the Northcutt orchard for two years, says that he found that Arnold's orchard was in a bad state of cultivation, was grown up in bushes and briers, had not been pruned and had a considerable amount of scale, coddling moth and aphis. It had San Jose scale when he had charge of it eight or nine years ago. The Northcutt orchard was also in bad condition, had been poorly cultivated and was grown up in weeds, briers and broom sedge, and had the same diseases that were found in the Arnold orchard. Both orchards had Frog Eye, from which leaves turn brown and the edges curl up. In examining the orchard he found no evidence of smoke injury and saw nothing that looked like injury from smoke (Vol. 2, pp. 1093-95).

J. H. QUINTRELL with Mr. Holt took a large number of cuttings from branches of trees growing in Arnold's orchard, which he left with Mr. Reese (Vol. 2, p. 1161). Mr. Reese divided them into three parts, sending one to G. M. Bentley, the State Entomologist at Knoxville (Vol. 2, pp. 1162-3).

MR. BENTLEY testifies that there were thirty-five of the cuttings submitted to him, twenty-four of which were infested with San Jose scale, three of them badly. Some of them had apple leaf rust. When an apple tree is affected with scale it dies from the outer limbs back, the leaves turn brown and the trees shed their foliage early (Vol. 2, pp. 1152-4).

(3) *Blue Ridge, Weaver's Creek, Morganton, Mineral Bluff.*

Some of these places are a considerable distance apart, but the general section in which they are located borders on and is immediately North of the Ellijay region.

### *PLAINTIFF'S EVIDENCE.*

J. M. CARTER says that in the years 1906, '07 and '08 he saw the whole foliage on Blue Ridge burned, and also saw the same condition in his section (Vol. 1, p. 215).

WM. BAILEY lives six miles Southwest from Blue Ridge, near Burnett (Vol. 1, pp. 218-9). He says smoke came in on the 2nd day of June the heaviest he ever saw, which caused injuries to crops (Vol. 1, p. 219). He has a claim filed against the Tennessee Copper Comaany fund, but can't remember the amount of it (Vol. 1, p. 223).

B. H. SEBOLT lives about three miles Northwest of Blue Ridge, on Sugar Creek (Vol. 1, p. 265). He claims that smoke has there a bad effect on vegetables and forests (Vol. 1, p. 265).

JOHN MILLER lives on Weaver's Creek, two miles South of Blue Ridge (Vol. 1, pp. 290-1). He describes very bad conditions, but says he filed a claim for damages for $1,000.00 and received $40.00 (Vol. 1, p. 195).

D. M. BUCHANAN lives near Weaver's Creek (Vol. 1, p. 203). He saw smoke there the 1st, 8th and 13th of June (Vol. 1, p. 204). He thinks timber and gardens have been bit by something (Vol. 1, p. 204), but says there was a drouth that hurt corn, and they hadn't had a good season (Vol. 1, p. 206).

Though witnesses Miller and Buchanan live close together, there is a great difference in their testimony, Miller claiming great damages while Buchanan testifies to very slight injuries.

C. J. TRAMELL lives two miles South of Blue Ridge (Vol. 1, p. 293). He owns eight hundred and forty-two acres. He saw smoke there in May, June and July (Vol. 1, pp. 294-5). He has a suit against this defendant for damages arising in 1906, '07 and '08. He has run a saw mill on his land for twenty years, and fire went through a portion of his orchard two years ago. For six weeks during the year 1914 they had no rain (Vol. 1, p. 301).

J. H. CLONTS was asked while his deposition was being taken to look at peach trees and apple trees and corn, which were growing in view, and he did so, but he said he could see no injuries except something was wrong with one leaf on a nearby tree (Vol. 1, pp. 91-2.)

A. E. SHARPE, Shippen Lumber Company's woodsman, testified to injuries elsewhere, but said he had been in the Blue Ridge two days before his deposition was taken, but had noticed no injury, although it was situated in one of the lowest gaps in the mountains, and is about half way between the furnaces and his home, in the vicinity of which he claims damages had occurred. He further says that three or four years before that the forests around there were all burned (Vol. 1, p. 158).

J. H. TURNER lives a mile from Morganton. He claims to have seen smoke frequently, and that it has caused much damage (Vol. 1, pp. 246-9). He put in a claim, but received $5.75 or $6.75. He even claims that he has seen sulphur smoke in Pickens County, thirty-five miles away (Vol. 1, p. 252).

J. M. CARTER lives one and one-half miles from Morganton, adjoining the farm of J. C. Addington, the man who raised the prize acre of corn in the year 1913. He claims that smoke was bad there in both 1913 and 1914 (Vol. 1, pp. 208-11), though he lives thirteen and one-half miles from Copper Hill and fifteen and one-half miles from Isabella (Vol. 1, p. 212). He filed a claim for damages and received $30.00 (Vol. 1, p. 213).

L. C. ALLEN lives one and one-half miles South of Morganton on Chastain's farm (Vol. 1, p. 230). He claims to have seen smoke in there many times (Vol. 1, pp. 230-1).

This witness is an example of many of the witnesses who testified for the plaintiff, whose evidence it is impossible to weigh without seeing them upon the witness stand. He is very ignorant, but claims to have kept a record upon an almanac, by making a cross mark opposite the date when anything of importance happened. Thus he claims to have marked the dates when smoke came in there, but there was also a mark opposite a date when he claims a fellow exposed himself before his grand-daughter for which he intended to indict him. There was also another date when a fellow cursed in the presence of his family, for which he was going to prosecute him. It likewise appears that his daughter at times marked dates to refresh her recollection (Vol. 1, pp. 233-4).

A. J. BELL has lived at Mineral Bluff since November, 1913, and before that in Cherokee County, N. C. (Vol. 1, p. 278). He tells of a streak a mile or a mile and a quarter in length immediately North of where he lives of which he thinks twenty per cent of the timber is damaged (Vol. 1, p. 278). On cross-examination he says he has been a witness many times against the company, and that conditions are much improved since the building of the acid plants (Vol. 1, p. 283). He has put in a claim for $10.00 damages (Vol. 1, p. 284).

### *Defendant's Evidence in Rebuttal.*

GRANT ORTEN has lived at Morganton since February, 1913, and farms (Vol. 2, p. 1063). He hasn't seen any smoke injury through there since some seven or eight years ago (Vol. 2, p. 1066).

T. E. GARREN lives in Morganton district (Vol. 2, p. 1067), and is acquainted with the Dora, the Start Creek, Morganton and Mineral Bluff sections. The condition of the forests, fields, orchards and gardens is good. He has been eight or nine miles up the Toccoa River, but hasn't seen any damage which he thinks has been done by smoke (Vol. 2, pp. 1067-8).

J. E. WILSON lives six miles from Copper Hill (Vol. 2, p. 1070). He has a good crop where he lives. He has about six acres in corn, which is fine, and has a good garden. His neighbors' gardens look good from outside appearance, and he sees nothing wrong with the wood lands (Vol. 2, pp. 1070-71).

ROBERT HAMPTON is acquainted with the Morganton, Mineral Bluff and Dora sections. He is in the mercantile business and travels considerably collecting. They have a phenomenal crop of peas, corn and beans and a good crop of apples in those sections, the potato crop was cut short by dry weather in May and June (Vol. 2, pp. 1074-5).

G. M. PANHORST, one of plaintiff's witnesses, says he has been to Blue Ridge and Mineral Bluff a half a dozen times, and the forests look perfectly green, and he has seen nothing to indicate they are in an abnormal condition (Vol. 1, p. 227).

F. T. LARGENT lives twelve or fifteen miles from Copper Hill near North Carolina line (Vol. 2, pp. 1079-80). When he went there three or four years ago he made ten bushels of corn to the acre, and now he raises sixty-five. A man by the name of Tom Henson took him out to his field to show where he was damaged that he might receive a part of the $16,500.00 Tennessee Company's fund. They found some roasting ears in silk, but he found on examination that a worm had cut the silk off at the cob, and that was what he claimed was smoke damage (Vol. 2, p. 1078).

E. L. STANLEY lives about a mile from Morganton, and knows the conditions within a few miles around that section and also in the Dora and Start Creek sections. He hasn't seen any damage during the year 1914 to the crops, gardens and orchards in these sections which he could attribute to the Ducktown smoke. His neighbors raise the usual crops (Vol. 2, pp. 1080-81).

J. M. DAVIS owns the place upon which witness J. J. Turner lives, four miles East of Blue Ridge on the Toccoa River (Vol. 2, p. 1083), and has there been cultivating corn, potatoes, peas and other garden truck. He hasn't seen a particle of smoke signs on his place, and none of his crops have been injured in any way by smoke, nor has the forest; and in his neighborhood not a single leaf of the forest has been discolored by smoke during the year 1914. He has given attention because there was an appropriation for the damage, and he thought he might as well have a part of it as anybody (Vol. 2, pp. 1083-4).

W. E. ROGERS lives by the side of witness Davis and on lands adjoining the farms cultivated by J. J. Turner and R. H. Smith, witnesses for plaintiff. He owns three hundred acres of land there and raises corn and other grain, and peas, beans, millet, potatoes and other garden stuff. He raises vegetables to sell, and has about three acres in Irish potatoes, a half acre in tomatoes, four acres in melons, an acre or so in early corn and the rest in late corn. His garden is about a quarter of a mile from Turner's garden in a rather Southeast direction. None of his crops of any kind so far as he could tell have been injured during the year. He watched very closely as there was talk about damage, and many were putting in claims, and he never noticed any discoloration on his garden, fields or forests, "though I watched with all the eyes I had."

His peas were about two hundred yards from the land Turner was cultivating, just a small branch being between his field of peas and the Turner land. He was never over Turner's land, but his garden is right by the side of the public road and he noticed nothing wrong with it. Wilson's corn was the best on that square of ground witness had ever seen there. There was an extremely dry spell in the forepart of the summer and some had short crops. He was present when a number of color photographs were taken by the photographer Thompson, and was shown photographs Nos. 123, 124, 125, 126, 127 and 128, and explains of what they are pictures. These photographs show exactly the condition of the vegetation and forests in that section when they were taken in September, 1914 (Vol. 2, pp. 1087-88).

### 3rd. PHOTOGRAPHS FILED AS EVIDENCE.

With its proof in chief, in addition to a number of plain photographs and a few color photographs taken by Professor Bain showing the conditions of forests elsewhere than in North Georgia (Exhibits 16 to 21, Vol. 2, pp. 906-7; Exhibits 52-58, Vol. 2, pp. 915-17; and Exhibits 59-64B, Vol. 2, pp. 917-18) and five plain photographs filed by J. H. Quintrell showing the condition of the young growth at and near mine Number 20, there was filed by Professor Bain fifty-three color photographs, of which thirty-three were made of gardens, lawns, orchards, and other views in the Ducktown Basin, many of them in the immediate vicinity of the furnaces (Exhibits 22-51, Vol. 2, pp. 910-14; and Exhibits 79, 83-84, Vol. 2, p. 936) and twenty views showing the conditions of crops and forests in that part of North Georgia which lies nearest to the furnaces and is most exposed to their smoke (Exhibits 1-10, Vol. 2, pp. 898-900; Exhibits 74-78, 80-82, 85-86, Vol. 2, pp. 935-7).

From August 4th to 7th, 1914, J. G. Adams took for plaintiff twenty-five plain photographs, some showing the furnaces and the smoke emitted from the many stacks in the Ducktown Basin, and others landscapes where it is claimed smoke injury to forests existed, and twenty-four of these photographs were filed as exhibits to Mr. Adams' deposition. From September 3rd to 17th thereafter (Vol. 2, pp. 1131-41, and 1164) defendant had J. E. Thompson, an artist skilled in color photography, to travel over the same ground covered by Mr. Adams and also all sections about which any material evidence had been introduced by plaintiff, and take color photographs as far as possible of the same places that had been photographed by Mr. Adams, and of such other views as would reproduce to the Court in concrete form the exact conditions of the forests, fields, gardens and orchards in those several localities; and they were filed as Exhibits to Mr. Thompson's deposition (Vol. 2, pp. 1130-41). The number taken by Mr. Thompson was one hundred and forty-two, being limited only by the number of color plates obtainable. The locality where each was made and the direction of the camera is shown on the map prepared for the use of the Court.

These color photographs are the most reliable and convincing evidence in the record, and that their relative reliability as compared with the plain photographs taken by Mr. Adams may appear, the evidence of Adams, Thompson and Reese relating to the photographs taken by Adams and those taken by Thompson of the same views and views in the same vicinities, is given somewhat extended consideration.

Mr. Adams was employed by Frank E. Shippen for the State of Georgia (Vol. 1, Q. 9, p. 359), and he was accompanied by Mr. Shippen, Mr. A. E. Sharpe, the woodsman of the Shippen Lumber Company, Mr. Vestal and Vestal's son (Vol. 1, Qs. 15-17, p. 395).

Mr. Reese, who accompanied Mr. Thompson, says it was their purpose to make color photographs showing conditions of crops and forests in Fannin and Gilmer

Counties in rebuttal to the evidence introduced by the State. He did not have present Mr. Adams' photographs, as they had already been filed, but he had along a copy of Adams' evidence, and he covered the same territory that was covered by Mr. Adams as much as he possibly could. Except in a very few instances he could not locate the very spots where Adams' photographs were taken, but he tried to locate and have photographed the same ground, and did so as nearly as possible (Vol. 2, p. 1164).

A few of Thompson's photographs, as will hereinafter appear, were undoubtedly of practically the same spots as those photographed by Mr. Adams (Vol. 2, p. 1164).

The evidence of Adams, Thompson and Reese relating to these several photographs is as follows:

Adams' Exhibit No. 1 was made on the Blue Ridge and Copper Hill road about seven miles Southeast of Copper Hill (Vol. 1, Q. 24, p. 360). Adams says that it shows a dead top across the forest and dead and dying trees with leaves on them a lighter shade (Vol. 1, Q. 26, p. 360).

Reese says that he couldn't locate Adams along there, but had some pictures taken of different views along the road (Vol. 2, p. 1169); and Thompson shows that his photo No. 132 was taken on this road ten miles, No. 133 about nine miles, and Nos. 134 and 135 about eight and one-half miles from Copper Hill, while No. 142 was taken close up to Copper Hill (Vol. 2, pp. 1140-1; see location on map).

Adams' Exhibit No. 2 was taken one mile South of Copper Hill looking North (Vol. 1, Q. 27, p. 360), and shows the smoky condition in the distance and the stack of the Tennessee furnace, but not that of the Ducktown furnace, because it was so smoky that it couldn't be seen (Vol. 1, Qs. 28-9, p. 360).

Adams' Exhibit No. 3 is of a view on a hill near Hopewell Church, looking towards Cow Pen Mountain, and he says shows smoky conditions of atmosphere and dead trees and stunted growth. Some of the trees in the back ground were dead and dying (Vol. 1, Qs. 30-33, p. 360).

Thompson's No. 142 is described as "view of Hopewell Church looking Westward" (Vol. 2, p. 1141), and the arrow on the map shows that the camera was pointing directly towards Cow Pen Mountain. Hence the Thompson photo shows the condition of timber and vegetation there precisely as it was in September.

Adams' Exhibit No.4 was taken from an iron bridge across Fighting Town Creek one quarter of a mile East of Madola, and he says shows dead tops all through there and dead young trees. He also says that certain trees in the foreground were dead and the leaves were brown, which caused them to show light on the photo, and that dark green shows black and white (Vol. 1, Qs. 34-40, p. 361).

This point was easily located, and Thompson took two pictures, Nos. 96 and 97, from this iron bridge, one looking East and the other North, or rather Northwest (Vol. 2, pp. 1138-1142 and map).

Reese testifies that Adams' photographs showed the bridge, and they located the camera at the same spot and made two photographs, one of the view East of the bridge and the other of the view West. There were no indications of dead trees there except old ones. There was no discoloration except No. 96 in the left hand side shows fall tints. He is about fifty years old, is familiar with forests and knows fall tints, and the forests through there usually begin to color in September, turning brown and yellow. He saw absolutely nothing unusual in the forests where this photograph was taken, and it shows how it was for itself (Vol. 2, pp. 1165-6).

Adams' Exhibit No. 5 was taken one-quarter of a mile North of Higdon's Store, lying West of Reddic Mountain near the top, and he says the light colored patches show trees which had died recently, and the outline shows the dead tops which existed everywhere through there (Vol. 1, Q. 41, p. 361).

On cross-examination it was suggested to the witness that what he claims to be dead trees are but white splotches on the photograph, having no distinct outline, and hence could not have indicated dead trees, but he claims that they look like well defined trees to him. He says the leaves were nearly white, slightly yellow, but not brown, rather a light tan. He has no idea what tanned the trees, or made them light, nor can he tell the variety, but thinks there was oak, pine and hickory there. He is then asked: "Maybe they (the white splotches) were the result of the development, and not the result of the brown or white or yellow leaves at all?"

"A. I couldn't tell you" (Vol. 1, pp. 384-5).

Thompson's photographs Nos. 104 and 105 were both taken on Ducktown Road, about a quarter of a mile North of Higdon's Store, one looking Westward and the other Southward (Vol. 2, p. 1138).

Reese says that these pictures were taken where Adams took a picture, and he made notes of the conditions when he was on the ground, and No. 104 shows some dead trees which had been dead for many years, and there were also in the landscape a few trees with yellow leaves which apparently had died from drouth. He is familiar with smoke injury and also injury from drouth, and knows that drouth will kill trees, and these trees did not have the appearance of having been killed by smoke fumes, but by drouth. This place is about six miles from Copper Hill and eight or nine from Ducktown. There was no evidence of smoke injury in the landscape appearing in photograph No. 105. There is a dead tree about the center, but he thinks it was killed by lightning or drouth, though he did not examine it (Vol. 2, pp. 1168-9). Thompson's photograph No. 106 was taken at Higdon's Store, and shows a perfectly healthy condition of a corn field and forest (Vol. 2, p. 1138).

Adams' Exhibit No. 6 was taken on Barnes Mountains, ten miles Southwest of Ducktown, and he says it shows dead tops of trees and dying trees, though it was made under adverse conditions and is not plain (Vol. 1, Qs. 43-5, p. 361).

Adams' Exhibit No. 7 was also taken on Barnes Mountain, looking Southeast (Northeast). It was intended that the stack of the furnace should show in the photograph, but he says it does not appear on account of the smoky condition of the atmosphere (Vol. 1, Qs. 47-9, p. 361).

Adams' Exhibit No. 8 was taken on Barnes Mountain looking East, and he says it shows a mountain some distance away and dead trees on it.

Adams' Exhibit No. 9 is another view taken from Barnes Mountain looking East on the same section of land as No. 8, and witness says it shows dead and dying timber and dead tops of trees (Vol. 1, Qs. 52-6, pp. 361-2).

On cross-examination, especially with reference to picture No. 9, witness says that he has no idea what killed the tree on the left hand side of the picture. It was old and the bark was off. There are a number of other trees shown to be stripped of foliage. He doesn't know how long they have been dead, but some of the smaller twigs had died recently (Vol. 1, Qs. 142-144, p. 376).

He has no definite recollection independent of the picture about the location of trees appearing in the picture which he claims were dying. He doesn't think he is merely guessing as to their location, but he says the trees which appear light show the dead and yellow leaves, some of the leaves being almost white. (The witness had previously testified that yellow showed very dark in the picture) (Vol. 1, Q. 107, pp. 373-4; Qs. 151-156, p. 376).

Thompson took photographs Nos. 98, 99, 100, 101, 102 and 103 on and about Barnes Mountain (Vol. 2, p. 1138).

With reference to these several photographs and the conditions on Barnes Mountains, Reese testifies that No. 98 shows the condition existing there in September, that there was absolutely no indication whatever of any smoke trouble, that as well as he could get at it Adams had taken photographs where they took that one, that he read Mr. Adams' evidence, and went as near as possible to the identical places, and tried as nearly as he could to take the pictures on the same ground, and that photograph was taken for the purpose of duplicating as nearly as possible the photograph of the place taken for the State of Georgia; that No. 99, a view of a meadow in the foreground and Barnes Mountain in the back ground shows Barnes Mountain where the Vestal crowd took views claiming smoke damage, and he doesn't think there was any sign of smoke injury around or on that mountain, but the picture answers for itself; that No. 100 was taken looking towards Barnes Gap, on Barnes Mountain, and shows a house in the foreground and corn field and quantity of trees killed by girdling in the center of the picture; but that these trees showed that they had been killed by an axe girdle for the purpose of clearing the ground for cultivation; and he didn't see a bit of evidence of smoke injury in that vicinity (Vol. 2, pp. 1166-68).

Adams' Exhibit No. 10 was taken a little West of Flat Top, and shows the hazy or smoky condition of the atmosphere (Vol. 1, Qs. 54-60, p. 362).

Adams' Exhibit No. 11 was taken on West side of Barnes Mountain looking Southwest. He says it shows large trees which had just recently died, some entirely and some just the tops (Vol. 1, Qs. 61-3, p. 362). On cross-examination he says the color of the smaller trees in the near foreground were either light green or dark green, very shiny. They caught the light and threw it up. He cannot say that all of them were in a perfectly healthy condition; some were not, but he is unable to point out those that were unhealthy. The foliage which shows the lightest in the picture was indicated to him, and he testifies that most of those leaves were green, and the reason they showed light in the picture was that they reflected a good deal of light (Vol. 1, p. 374).

The witness had claimed on examination in chief that the photographs could be relied on as showing dead leaves because such leaves appeared light in the photograph.

Adams' Exhibit No. 11 and Thompson's photographs Nos. 102 and 103 must have been taken about the same place (See Map).

Adams' Exhibit No. 12 was taken on Pigeon Mountain, Northeast of Blue Ridge. He says it shows a number of dead and dying trees, indicated by the light blotches (Vol. 1, Qs. 64-7, pp. 362-3). But he was shown in the picture some bushes in the foreground which show up light, and he says they had shiny leaf surfaces like laurel, and nothing was wrong with them that he knew of (Vol. 1, p. 383). And he admits that on the right hand side there are many green leaves which show some light and some dark, and with reference to the smoke drifting up the valley he says he couldn't tell whether it was smoke or fog, as smoke drifting that way looks like fog (Vol. 1, p. 390).

Adams' Exhibit No. 13 was taken looking at Granny Marr Mountain a little South of the Crest, and he says that it shows dead and dying trees, a number having died recently (Vol. 1, Qs. 69-70, p. 363).

Thompson's No. 93 was taken looking West and shows Granny Marr Mountain (Vol. 2, p. 1138).

Reese testifies that No. 93 shows the Granny Marr Mountain where Adams had taken some photographs; that where it was claimed by Mr. Adams there was discoloration of the forest there was nothing particularly wrong except possibly some fall tint on the foliage, and that he did not observe a thing wrong about the appearance of the forest for that season of the year; and that the condition of the forest is correctly represented by Thompson's photograph (Vol. 2, p. 1166).

Adams' Exhibit No. 14 was taken from the top of Granny Marr Mountain looking towards the furnaces, and shows the smoky condition of the atmosphere (Vol. 1, Qs. 70-75, p. 363).

On cross-examination he testifies about this picture that it doesn't show the Ducktown plant or any smoke issuing from it because the air was too dense with smoke, that there were stacks to the power house which emit smoke, and he could see smoke in several places, some of it being black coal smoke; that the smoke that comes out of the furnaces has the lightest color of any smoke in the Basin; that one could see the smoke rising up in the Basin, and probably the smoke from all the stacks got together and produced a haze over the Ducktown Basin, or helped to do it. He lives in Atlanta, and has seen at times so much smoke that came from the stacks of the manufacturing plants that he could hardly see across the street, and has seen the time when he couldn't get a good photograph even by long exposure of a house across the street (Vol. 1, pp. 278-9).

Adams' Exhibit Nos. 15 and 16 were taken on Tumbling Creek. No. 15 he says shows dead and dying timber and No. 16 some large timber dead (Qs. 76-81, pp. 363-4). With reference to No. 15 he says that there are some bushes in the foreground which show light in the picture that had green leaves. He thinks they were in a nice healthy condition, and that the same was true with reference to some trees in the foreground in No. 16, especially on the left hand side (Vol. 1, p. 383). There were quite a number of trees which show up white in the foreground in No. 15, nearly all the leaves of which were green. These were intermingled with other green leaves which show up dark. There were may trees exactly the same color, some of which show up dark and some light. A shiny leaf reflects the light at certain angles, whether in the background or foreground (Vol. 1, pp. 389).

Adams' Exhibit No. 17 was taken within a quarter of a mile of Exhibit 16, and he says it shows dead and dying timber, two trees where light places are shown being dead (Vol. 1, Qs. 81-3, p. 364).

Adams' Exhibit No. 18 was taken from Burnt Store Church, three and one-half miles from the Ducktown plant. It shows thick smoke settled all through the country. The vertical black streak on the right is a defect in the plate (Vol. 1, Qs. 83-8, p. 364).

Thompson's photo No. 90 was taken at the same place and looking in the same direction, and shows the Tennessee plant at right, Ducktown plant at left, and Pack Mountain in the distance (Vol. 2, p. 1137). There was certainly not sufficient smoke existing at that time to interfere with the taking of a color photograph.

Adams' Exhibit No. 19 was taken near Hopewell Church, looking East about two to three miles from the plant, and shows smoke of all kinds as it drifts into Georgia.

Thompson's Exhibit 142 was taken at the same place (Vol. 2, p. 1141). In this picture the camera was turned Westward, as it was thought to be more important to know the condition of the forests and vegetation there than to see how much smoke produced in the Basin at some particular moment drifted into Georgia.

Adams' Exhibits Nos. 20 and 21 are of the Ducktown plant, and No. 2 shows the barren soil South of the plant. No. 23 was omitted because a duplicate of No. 24 and Nos. 24 and 25 are views of the Tennessee plant (Vol. 1, p. 366). The photographer was only about fifty yards distant from the Ducktown plant when it was taken, but was about a quarter of a mile from the Tennessee plant when it was photographed (Vol. 1, p. 381); hence the Ducktown plant shows up much larger than the Tennessee plant. Photograph No. 2 in addition to the barren soil also shows trees and bushes; and when asked to point out any part of the foliage that was killed he answered: "I don't know that I can point out any at all, but I know that some of the smaller bushes are dying," and he indicated one by a house, which he thought was dead, but admitted that the picture does not show it. This picture shows quite a scope of country lying South of the Tennessee plant, and while he claims that some of the trees appearing in the picture were not in a healthy condition, yet he admits that the picture does not show them to be unhealthy, because he says it was made when the sky was overcast with clouds (Vol. 1, p. 375).

Mr. Adams' photographs can be of no material value. Such photographs show truthfully trees which are dead and stripped of their foliage, but it is not denied that there are dead trees and trees with dead tops in the forests photographed. However, defendant does deny that any trees or tops of trees in those localities have died from smoke fumes within the last four or five years, but such denial cannot be contradicted by the photographs. As to whether or not the foliage of trees was browned Mr. Adams shows conclusively that these photographs are wholly unreliable. Whether a leaf will show dark or light in the photograph depends not only upon its color, but also upon the character of its surface and its position to the rays of the sun and camera. In showing the presence of smoke in the atmosphere no contention of defendant was contradicted. The sulphur fumes are the lightest in color of all smoke, and there are more than twenty stacks in the Ducktown Basin, most of which emit heavy black smoke (Vol. 1, p. 418).

An attempt was made to show by this witness that color photographs do not reproduce colors truthfully; but he shows the densest ignorance of color photography. He appears to think that separate plates are used, one for each color, and then by some means a composite is made of them all (Vol. 1, pp. 369-70, and 386); and he says that it would require nearly a day to take a parrot in colors, and many weeks and months to get a picture showing the colors of a garden which contains a number of flowers. He is asked:

"Then if there has been filed in this case, fifty or one hundred photographs showing the coloring of all the flowers and vegetables in gardens, that fellow must have worked a hundred years?

A. I suppose so, if he made it by photography" (Vol. 1, pp. 390-91).

He knows nothing about the science of photography, and shows he has no knowledge of the reflection of light from surfaces of different colors (Vol. 1, pp. 372-3).

Mr. Thompson testifies that these photographs speak absolutely true to nature (Vol. 2, pp. 1146-7).

**4th. Timber in North Georgia has been killed by fires, worms and other causes, to which forests are usually incident.**

It is shown that there are many saw mill sites in the forests of North Georgia, and that considerable portions of it have been cut over by lumber men. In logging the body of the tree is removed, and the laps are left lying in the woods, surrounding other timber, and are ready fuel for forest fires, greatly adding to the intensity of their heat and making them far more destructive to the standing timber. There is much evidence of timber in the forests of North Georgia having been injured in this way (Sherman Reese, Vol. 2, pp. 634-5; W. G. Payne, Vol. 2, pp. 709-10; L. A. Hughes, Vol. 2, p. 719; J. A. Miller, Vol. 2, p. 726; R. A. Shiflett, Vol. 1, pp. 480-81).

With reference to other causes of injury Professor Bain says that in many instances it is impossible to distinguish smoke damage from drouth, and a botanist approaches the determination of the cause of any injury rather by elimination of injuries known to be due to natural causes.

For instance, in the case of the maple, a specimen of which he noticed was affected by some disease; its foliage being one of the most resistant species to the action of the smoke, and other plants decidedly more sensitive being with it and not damaged, it was safe to say that the maple was not injured by smoke fumes. A leaf injured by smoke is at first brown, some in spots, and then the spots become white, and as to pines and other conifers the tips of the leaves become slightly pale in color, then redden and then brown; but in many instances other diseases give the same appearance to the casuel observer. He files as Exhibits Nos. 11 and 12 leaves which had been affected by drouth but had very much the appearance of having been injured by smoke (Vol. 2, pp. 901-

2), and he files as Exhibit No. 13 a specimen that came from the top of Chilhowee Mountain in Blount County, Tennessee, eighty miles from the furnaces, which is affected in the same way (Vol. 2, p. 902). These leaves were all affected by the want of moisture, and the same effect results from forest fires or diseased roots or anything that prevents moisture from reaching the leaves through the fibres of the tree (Vol. 2, pp. 902-3). He also files as Exhibit No. 14 a specimen of leaves of white pine affected with leaf tip disease which first appears on the tips of the leaves and is very similar to the effect of smoke (Vol. 2, pp. 903-4). This leaf was taken eleven miles from Copper Hill and fourteen from Isabella; and he files as Exhibit No. 15 another specimen affected with the same disease and obtained nineteen and one-half miles from the Ducktown furnace; and he says he found specimens of the same disease in Sevier County, Tenn. (Vol. 2, p. 904). In many instances by inspection it is impossible from an examination of isolated specimens to tell whether an injury has resulted from smoke fumes or from frost. If the specimen could be gotten soon enough after the frost action it could be told from microscopic inspection, as the frost freezes the water in the cells and ruptures them (Vol. 2, p. 945).

He saw evidence of there having been fires through that section of North Georgia. There were scalded trunks of trees, and occasionally tracts where the trees were burned over and dead, and fires are likely to kill the small growth (Vol. 2, pp. 907-8).

On cross-examination he stated that a North Georgia forest would show up badly in comparison with a healthy forest, but he explains that he meant a forest properly cared for, that had not been attacked by fires, which had not been mismanaged, and over which improper lumbering had not been conducted (Vol. 2, p. 964).

**5th. Forests elsewhere are in a worse condition than are those in North Georgia, and contain more dead and dying timber.**

PROFESSOR BAIN made a special examination of forests in Sevier and Blount Counties, Tennessee, and Mitchell and Yancey Counties, North Carolina, all in the Allegheny Mountains, and through Morgan, Putnam and a number of other Tennessee Counties in the Cumberland Mountains and on the Cumberland Plateau. He testifies that the conditions in Sevier County, Tennessee, were about the same as in Georgia, but that the leaf tip disease on the pine is especially marked at Elkmont, Sevier County. He also found trees in the same condition in Blount County (Vol. 2, p. 905). He found trees known as the nigger pine dying much more from the attacks of a beetle in Blount and Sevier Counties than in Georgia, and saw more dead pines on the trip through those counties in five miles than he saw on the whole trip in Georgia, but he thinks there has been greater destruction by fire in North Georgia than in the high mountains in Sevier County; and leaving fire out of consideration he recognized more diseased timber in Blount and Sevier Counties than in Georgia (Vol. 2, pp. 905-6).

He took six color photographs showing the conditions of timber in Blount County, Tennessee, and files them as Exhibits Nos. 16 to 21 of his deposition. No. 16 shows two nigger pines freshly killed by the beetle. No. 17 shows a birch tree with a dying top. He didn't find much of that condition in North Georgia on birch, but did on chestnuts. No. 18 shows two white pines in Sevier County dying with exactly the same symptoms as were trees he observed in North Georgia. No. 19 shows a white pine dying of the same symptoms, and in that group he saw twelve pines in a dying condition, with a hemlock in a perfect state of health. No. 20 is a view of a mountain slope in Sevier County at an altitude of thirty-five hundred to four thousand feet taken to show a forest in good condition. No. 21 shows a chestnut tree in Sevier County with the top dying from lack of water caused by forest fires or improper lumbering (Vol. 2, p. 907).

He took seven plain photographs, which he files as Exhibits 52 to 58 (Vol. 2, pp. 915-17) to his deposition, of views in the Cumberland Plateau region of Tennessee, and seven views in Western North Carolina along the Carolina, Clinchfield & Ohio Railroad, which he files as Exhibits 59 to 64B (Vol. 2, pp. 817-18). The points photographed are far removed from these or any other furnaces of like character.

The conditions of the forests in Tennessee and North Carolina as shown by these photographs are incomparably worse than any landscape in North Georgia shown by any photograph filed by either plaintiff or defendant. Comparing the conditions of forests in North Georgia with those through the sections in Tennessee and North Carolina which he examined, the witnessee and North Carolina which he examined, the witness says that, judging from the existence of recently dead trees and the standing dead timber, the conditions of the forests in North Georgia are healthier than it is in many of the sections in Tennessee and North Carolina. For instance, going from Johnson City to Altapass, for a few miles the forest is in a relatively good condition, but sections were then observed where the trees were dying on a large scale. In the Cumberland region white pine, hemlock and chestnut are on a whole in a decidedly worse condition than they are in the region of North Georgia (Vol. 2, p. 919).

A number of gentlemen, among whom were witnesses J. M. Senter, G. C. Parks, Sherman Reese, M. T. Fouts, C. G. Baugh, L. A. Hughes, J. A. Miller and R. A. Shiflett made a trip of inspection through parts of Anderson, Rhea, Morgan, Scott, Overton, Fentress, Putnam and probably other counties in the Cumberland Mountains and on the Cumberland Plateau in Tennessee. Mr. Shiflett, who has had much experience in inspecting large boundaries of timber independent of this trip and is very familiar with large sections of forests in East Tennessee and in parts of Eastern Kentucky and Western North Carolina, says that conditions of timber in North Georgia are far better than they are in Tennessee. There was less dead timber there than he observed hundreds of miles away from the furnaces in Tennessee and Kentucky and North Carolina. The percentage of dead timber in Yancey and Mitchell Counties, North Carolina, and Whitley County, Kentucky, is greater than in North Georgia. There is a great deal of dead hemlock in the counties of Tennessee, Kentucky and North Carolina through which he traveled (Vol. 1, p. 476). In some places it is nearly all dead (Vol. 1, pp. 476-7). In Georgia he found a good deal of hemlock in the smoke zone and some beyond that zone. Some had been cut down and manufactured into lumber and some of it was dying, as on Jacks River, but not as rapidly as in the counties of Tennessee; and he is positive that he saw no hemlock on Jacks River dying from smoke fumes (Vol. 1, p. 477). The chestnut is dying in the counties mentioned of Tennessee and North Carolina, but he saw very fine bodies of chestnut in the Jacks River country and on the East slope of Cow Pen Mountain, and while on his inspections in 1912 and '13 he saw no evidence of smoke damage to chestnut in North Georgia (Vol. 1, p. 478). He saw more fine bodies of oak in North Georgia than anywhere else except in Polk County, Tennessee. The best he saw was near Higdon's place on Fighting Town Creek, ten or twelve miles from the furnaces. On his travels he saw no damage to oak timber outside of the smoke limit near the furnaces, where it is nearly all cut out (Vol. 1, p. 479). The white pine they found in North Georgia on their inspection trip was thrifty, and he saw no evidence of smoke upon it, though it is especially susceptible. In the counties in Tennessee through which they passed they found the greater part of the white pine dying. The general condition of the forests in North Georgia was far better than that of other forests through which he has traveled, except in Harlan County, Kentucky, where the conditions are about the same (Vol. 1, p. 483).

As to the comparative conditions of the forests generally in North Georgia and in the Cumberland Mountains and on the Cumberland Plateau in East Tennessee, Professor Bain and Mr. Shiflett are fully corroborated by J. M. SENTER (Vol. 1, p. 584); G. C. PARKS (Vol. 1, p. 591); SHERMAN REESE (Vol. 2, pp. 634-5); M. T. FOUTS (Vol. 2, p. 641); C. G. BAUGH (Vol. 2, pp. 686-7); L. A. HUGHES (Vol. 2, p. 719); J. A. MILLER (Vol. 2, pp. 725-726).

W. G. PAYNE says he has made several trips West, and has hunted in the Rocky Mountains and in the mountains of Arkansas and Missouri. He has also been through sections of Virginia, Kentucky and South Carolina, and was with the party that made an inspection trip through North Georgia, and he testifies that with the exception of forest fires on Cobb Mountain the North Georgia section is as green as the witness has seen in twenty years. There is of course some dead timber there. The loggers leave the brush piled up against trees and fire will kill a good deal of timber (Vol. 2, pp. 707-9).

## III.

**Whatever injuries are now, or have been for the last five years, done by sulphur fumes to the forests, crops, gardens and all other forms of vegetation in North Georgia, are being and have been produced by smoke escaping from the plant of the Tennessee Copper Company, and not by the smoke emitted by the furnaces of this defendant.**

On the original hearing no separate defense was made by this defendant. The defenses especially relied upon were the want of jurisdiction of the Court, and that an injunction would not lie in this character of case. These defenses were presented by the defendants jointly, and it was not attempted to show which of the them was responsible for the poisonous fumes that drifted into the State of Georgia.

Now the attitude of the defendants is altogether different, and these changed conditions have been brought about very largely by the State of Georgia. Hereafter it will be shown how, immediately after the decision of this Court, W. H. and Frank E. Shippen, President and Vice-President, respectively, of the Shippen Lumber Company, mainly by whom, according to their own representations, the State of Georgia was induced to bring this action, began to negotiate with the Tennessee Copper Company for a settlement, and how that company not only purchased a perpetual easement to float smoke over the lands of the Shippen Lumber Company, but secretly became its largest stockholder. But the more important fact in this connection is, that if the two defendants ever could have been considered as jointly liable for this alleged nuisance, the State of Georgia has itself separated them by negotiating an agreement with the Tennessee Copper Company whereby, for a money consideration, it has waived for a definite period of time, all right it may have as to that company to demand a final decree. Hence the State of Georgia now bears one relationship to the Tennessee Company and another to this defendant. It has bargained away its right to enjoin the Tennessee Company from emitting smoke, but demands an injunction prohibiting this defendant from doing *precisely the same thing*.

The question, therefore, which the Court is specially inquiring into is whether *this* defendant is *now* doing substantial injury to the domain of the State of Georgia, and not whether, in 1906 and '07, its domain was being injured by either one or both the defendants, regardless of the one doing the injury, which was the question then decided.

In determining that question every fact which may materially aid the Court in reaching a correct conclusion may be looked to, regardless of whether such fact occurred or existed before the original hearing in 1907, or has occurred or come into existence since that date.

The following facts show that, if any substantial damages are, or for a number of years have been produced in the State of Georgia by sulphur fumes, those fumes escaped from the furnaces of the Tennessee Copper Company, and not from the furnace operated by this defendant.

**1st. The relative locations, construction, capacities and operations of the two furnaces.**

(a) *The location of the Tennessee furnace is more favorable for the transmission of smoke into Georgia than that of the Ducktown Company.*

The Tennessee furnace is located a quarter of a mile from the Georgia line, while the distance between the State line and defendant's furnace is two and one-half to three miles (See W. F. Naughan, Vol. 1, p. 559; see also map). Between the Tennessee furnace and the State of Georgia there are no intervening hills. On the other hand, the stack of defendant's furnace is sixteen hundred and eighty feet above sea level, and there is a chain of hills immediately South of the plant from seventeen hundred and eighty-three to eighteen hundred feet above the sea, or more than one hundred feet higher than the stack (Bowron, Vol. 2, p. 776). Lamoreaux files as Exhibit No. 4 a profile of a vertical plane running North and South through the Ducktown furnace, which shows the height of the hills and of both the furnace stacks (Lamoreaux, Vol. 2, pp. 806-9).

Again: Smoke naturally follows water courses, probably because as streams pass through the lowest gaps air currents move up and down them (Lamoreaux, Vol. 2, p. 809; Reese, Vol. 2, pp. 632-4). The Tennessee furnace stands near the banks of the river, and naturally its fumes drift up the river into Georgia or down the river into Tennessee, according to the direction of the air current. But as to the smoke from defendant's plant, Mr. Bowron says that it would have to be drawn down Potato Creek and go over some hills or pass through the low places probably seventeen hundred feet high, and then down to the Davis Mill Creek section in order to reach Georgia along a water course; and according to his observation it does not get even to Copper Hill (Vol. 2, pp. 777-8). Reese says that the smoke will go further up Toccoa River than any other direction into Georgia, and for the smoke of the Ducktown plant to reach Georgia along a water course it would have to drift down Potato Creek to the Toccoa River and then back up the river a reverse course, and from his observation the smoke does not do that. The creek is very crooked, and it is three or four miles from the plant to its mouth (Vol. 2, pp. 633-4).

Furthermore, according to Bowron it matters but little whether the wind is blowing or not, as the current is above the top of the hills, and there are local conditions in the little valleys underneath, which control the smoke. For illustration, he saw smoke from burning brush heaps drifting Eastward when the wind was blowing Northwestward, and he says the fumes from the Ducktown plant are broken up when they strike the hills and settle in the Basin (Vol. 2, p. 793).

(*b*) *The construction of the Tennessee furnace is more favorable for the transmission of smoke into Georgia than is the construction of the Ducktown furnace.*

The top of the stack of the Tennessee furnace is three hundred and twenty-five feet above the base, or about eighteen hundred and eighty-five feet above sea level, while the top of defendant's stack is seventy feet above the base and sixteen hundred and eighty feet above sea level (W. N. Bowron, Vol. 2, p. 776). Therefore, the Tennessee stack is two hundred and five feet higher than defendant's. Lamoreaux says the Tennessee stack is approximately a hundred and ninety-five feet higher than defendant's stack (Vol. 2, p. 796). Their relative heights are also shown by the profiles filed as Exhibits 2, 3 and 4 to Lamoreaux's deposition. This high stack was completed by the Tennessee Company in 1906 (Shiflett, Vol. 1, pp. 470-1; Lamoreaux, Vol. 2, p. 796). Reese says the height of the stack of the Ducktown Company has been about the same ever since it began operations in 1891 (Vol. 2, p. 1007). The Tennessee stack is made of fire brick, and is twenty feet in diameter, and the fumes retain much of their heat until they reach the top of the stack, while defendant's stack is seven feet in diameter and made of sheet steel, a thin metal which has a cooling effect all the way up (Bowron, Vol. 2, p. 776). As sulphur dioxide is 2.2 heavier than air at the same temperature (Bowron, Vol. 2, p. 790; Lamoreaux, Vol. 2, Q. 56, p. 810), it is certain that it can never rise high above or float a great distance from defendant's furnace; and if smoke has been seen floating from its plant into the State of Georgia it was coal smoke from its power house, and not sulphur dioxide from its furnace.

Mr. Lamoreaux says that when a light wind is blowing to the South the smoke breaks off directly with the top of the stack, never rising above fifteen feet, and it then first encounters the tall acid chamber which is higher than the stack, and is broken up (Vol. 2, Q. 79, p. 816).

(*c*) *The capacity and amount or ore consumed by the Tennessee plant is far in excess of that of this defendant, while this defendant's acid plant has greater relative efficiency.*

The Tennessee Company has seven furnaces, while defendant has only two, and but one is operated during the growing season (Lamoreaux, Vol. 2, pp. 802-3; Naughan, Vol. 1, pp. 562-3). On the other hand, the acid plant installed by defendant is relatively far more efficient than the acid plant of the Tennessee Company. When the Tennessee acid plant was installed in 1908 it was not a success because its estimated capacity was only four hundred tons of sulphuric acid per day, but it never succeeded in producing that amount, and did not, in fact, have one-fifth capacity to take care of the sulphur dioxide in the smoke. It is now claimed to have a capacity of twelve hundred tons, but that is not sufficient to take care of the smoke now produced. Because of its failure to operate successfully the Tennessee Company employed additional consulting engineers, and the transformation from the smaller into the present large unit began about three years ago, and was completed something like two years ago (Lamoreaux, Vol. 2, p. 820). J. H. QUINTRELL says the Tennessee Company installed its acid plant in 1908, first building two chambers. The next year (1909) they made an addition and year before last (1912) they made another addition, and for the last two years they have been operating six chambers (Vol. 2, pp. 755-6).

When Bowron visited the Tennessee plant in 1910 the acid plant was largely under construction, and it was taking care of only from one-fourth to one-third of the sulphur (Vol. 2, pp. 771-2).

Reese files as Exhibits 1-9 of his deposition photographs which show defendant's acid plant in various stages of construction. These pictures are explained by Reese, and the magnitude of the acid plant readily appears therefrom.

The efficiency of defendant's acid plant as compared with the capacity of its furnace has been heretofore considered in showing the extent of the improvements made by defendant since the decision of this court in 1907.

(*d*) *The ore used by the Tennessee Company contains a higher per cent of sulphur than that smelted by defendant, and in smelting a larger per cent of sulphur is extracted from the ore and emitted into the atmosphere.*

Mr. Lamoreaux details at length defendant's method of analyzing its ores, which shows that it is done with great particularity and accuracy (Vol. 2, p. 801); and after giving the per cent of sulphur contained in the ore taken from each mine, he says the sulphur in the total ore used averages about fifteen per cent (Vol. 2, p. 800); and while he cannot state precisely the per cent of sulphur contained in the ore smelted by the Tennessee Company, yet he mentions the character of their mines, and testifies that it is quite in excess of that smelted by defendant (Vol. 2, p. 802). Furthermore, defendant only manufactures copper matt, which is twenty-five per cent sulphur (Vol. 2, Q. 37, p. 799); that is, a very considerable part of the sulphur remains in the product which is shipped away. But the Tennessee plant produces copper pig, which is 99.5

per cent pure copper, the remainder being oxygen and a small amount of gold and silver. Hence all the sulphur is eliminated from the ores at the Tennessee furnace. And up to four years ago the Tennessee Company purchased from defendant its product, and refined it to blister copper, thus eliminating in its plant the twenty-five per cent of sulphur contained in the matt (Vol. 2, pp. 798-9).

(*e*) *This defendant has exercised far more care to avoid the emission of fumes than has the Tennessee Company.*

The course pursued by this defendant since the decision of this Court in 1907 is stronger evidence of intention to faithfully comply with the rule of law then declared than is the course pursued by the Tennessee Company. This defendant at once began to experiment in order to perfect improvements that would unquestionably prevent any material injury from ever being done in the State of Georgia by fumes escaping from its furnace. While it appreciated the postponement of a final decree, yet it made no dicker with either plaintiff or any party who claimed to be an instigator of the litigtaion. But, as heretofore stated, the Tennessee Company at once began negotiations to purchase peace with the Shippen Lumber Company, which was by far the largest landholder in North Georgia, and has since entered into a contract with the plaintiff to pay $16,500.00 per annum for three years for the privilege of continuing to operate its furnaces and permit its smoke to float into Georgia. As it has purchased these privileges, its exercise of care in operating the plant is naturally not so great.

But there is positive proof that the Tennessee Company has not exercised due care in its endeavors to prevent an emission of fumes. Mr. Bowron makes a comparison between the methods of operation, when he was sent there on a trip of inspection in 1910 by the Governor and Attorney General of the State of Georgia. He was asked: "What was the working condition of the two plants as compared with each other, as to whether they were good, bad or indifferent?"

A. "The Tennessee Copper Company's, it was working fairly well, and in normal condition at the time of my visit. With the other plant at Isabella, it was working just absolutely perfectly. Mr. Hatch, the architect of the plant, was in charge of it, and showed me over it. It was in perfect working condition" (Vol. 2, Q. 28, p. 772).

He further says that this defendant had no knowledge of his presence in the District.

Mr. Reese testifies that when he is at home he sees the stack of the Tennessee Company two or three times a day, and when it is operating there is never a time when fumes are not being sent out in volume from the top of the stack (Vol. 2, pp. 979-80).

In other sections of this brief there is cited the evidence of witnesses who testify that the smoke observed by them came from the Tennessee furnaces.

*(f) In consideration of all the foregoing facts it is the opinion of the experts that no damage can be done in the State of Georgia by fumes escaping from defendant's furnace.*

Mr. Bowron says that "I will unhesitatingly say that it is practically impossible for the operations at Isabella to affect the State of Georgia in any way" (Vol. 2, Q. 82, p. 772).

Dr. McCandless is asked as to the possibility or probability of the operations of the Ducktown Copper Company as normally carried on exerting any harmful effect on the forests and gardens in Fannin County, Georgia, and answers: "I think it is an impossibility, absolutely impossible for it to have any effect" (Vol. 2, Q. 24, p. 837).

Professor Bain says that from a study of the situation he does "not believe that the company (Ducktown S. C. & I. Co.) is at present doing any damage in the State of Georgia;" and he does not believe that under similar conditions any damage could result to the forests and other vegetation in the State of Georgia (Vol. 2, Qs. 221-30, pp. 966-7).

When asked from his observations to state from which of the furnaces the damages have resulted for the last four or five years, Mr. Shiflett says that if there has been any damage at all, "it must have come from the Tennessee Copper Company's plant." It smelts more ore and the stack is higher by a hundred feet, and the smoke would carry to a greater distance into the mountainous section, and it is three miles nearer the Georgia line (Vol. 1, pp. 498-9).

Mr. Gilchrist says if there was damage to the vegetation in Georgia it must be the other (Tennessee) furnace, which is nearer, that is doing it (Vol. 2, p. 825).

In striking contradiction to the opinions of these experts is that of Dr. Hedgecock, who in response to the inquiry to which plant he attributes the damage in the forests through which he traveled, said:

"I would attribute the greater part to the Ducktown plant and a minor part to the Copper Hill plant, until you get high up on the mountain, when you get to the top of the mountain it would be hard to say, on the high mountains" (Vol. 1, Q. 101, pp. 16-17).

His theory is that the smoke from the stacks of the two furnaces floats horizontally until it strikes some hill or mountain, and as the stack of the Ducktown furnace is much lower than that of the Tennessee furnace, its smoke does the damage on the hills and the lower parts of the mountains. This, however, does not ex-plain why he thinks the Ducktown furnace is equally responsible for the damage to forests on the high mountains. Clearly the witness does not take into consideration the fact that there is an intervening ridge between the State line and the Ducktown plant which the smoke from that furnace would first strike, and the further fact that as sulphur dioxide is 2.2 heavier than air it must necessarily descend to the earth soon after its emission from the stack.

That smoke will so descend is shown by Mr. Panhorst, who was introduced by plaintiff. He had testified that there was fine corn growing about a quarter of a mile from the Tennessee plant, and in an effort to show that this corn was not injured because the fumes from the Tennessee stack passed over it, he was asked:

"And naturally if the wind was blowing, it would go over that corn field?

A. In some cases it would and in some it wouldn't. I have seen the smoke from that stack when the atmosphere was heavy, go almost down on the plant.

Q. But under ordinary conditions it would blow away?

A. That would depend on the atmospheric conditions" (Vol. 1, p. 228).

Attention is also again called to the testimony of J. H. Quintrell, previously cited, who says that on June 8th he saw the smoke from this high stack striking the ground from five hundred to a thousand feet from the furnace.

On cross-examination, with reference to this statement, the witness, Hedgecock, was asked:

"Q. 143. Now, Doctor, do you say that the Tennessee plant, that is the plant of the Copper Hill Company, could not have done that damage? (Referring to damages on Barnes Mountain and elsewhere testified to by the witness).

A. Because the smoke carries too high, ordinarily. I admit that it might drop down nearer and do some damage.

Q. 144. Then you admit it might have done it?

A. It might have done it. I said it wasn't all due to the Ducktown Company.

Q. 145. You mean to testify the fumes coming out of the high stack at Copper Hill couldn't produce the damage within three miles of that plant?

A. It could in foggy, damp weather, when the fumes come down quickly" (Vol. 1, p. 29).

If the sulphur fumes from the high Tennessee stack could have cooled off and descended to the ground within two or three miles, then certainly the fumes from the Ducktown stack, which were largely cooled before entering the atmosphere, would be dissipated by the intervening hills before reaching Georgia.

This expert witness is only a plant pathologist, and does not profess to have any expert knowledge about the characteristics of gases; and his willingness to ascribe the greater part of the injuries occurring in Georgia to this defendant's furnace is but an evidence of the biased and unreliable character of his testimony.

**2nd. A very large part, if not all of the injuries, to vegetation and forests in Georgia in 1914, occurred on June 8th and 9th, and it is positively proven that the fumes which then passed into Georgia were emitted by the furnace of the Tennessee Copper Company.**

These dates are mentioned by so many witnesses introduced by both plaintiff and defendant that what then happened deserves special mention. One striking circumstance is that this should have occurred but ten days before the taking of defendant's evidence (Vol. 1, p. 556), when it was making preparation to prove that smoke fumes were then causing no damage in Georgia. This fact indicates that the smoke did not escape from defendant's furnace, and excites curiosity as to why it should have been permitted to escape at all.

These dates are mentioned by the following witnesses introduced by defendant:

J. W. PELFREY, who lives about two miles air course from Copper Hill, says he saw smoke going towards Fryetown on the 7th, 8th or 9th, but paid no attention to the point from where it was coming. It bit the leaves of the garden peas and beet leaves and turned them yellow, but the damage was slight (Vol. 2, pp. 616-17).

W. T. S. DICKEY, when asked when it was he had smelled smoke at Mineral Bluff, says he would not be positive, but it was on Monday or Tuesday, he believes a couple of weeks before (Vol. 2, Q. 90, p. 855). His testimony was given June 19th (Vol. 2, p. 856). Hence it must have been on Monday or Tuesday, June 8th or 9th.

J. B. KINSEY says there was a little bit of smoke came over Epworth about the 8th or 9th of June, and it seemed for a little bit it hurt everything considerably, but in the course of ten or twelve days it was about all gone (Vol. 2, p. 1012).

The following witnesses introduced by plaintiff specially mention these dates:

C. S. NORTHCUTT, who lives in Turnip Town (Ellijay section), says the heaviest smoke he noticed was on the 8th and 9th of June, a little after twelve o'clock (Vol. 1, p. 97).

ASBURY HINSON of the same place says that the heaviest he ever saw the smoke was on the 8th and 9th of June from eleven A. M. to two P. M., and the next day the smoke was so thick that he could not see the trees, and the first effect was from this smoke in June (Vol. 1, pp. 99-101).

W. A. PAINTER of the same place says that the smoke was worse along about the 8th and 9th of June. It was after that that he noticed the damage (Vol. 1, p. 111).

W. S. HINSON of the same place says he saw smoke on the 8th and 9th of June. He was in Arnold's and his and his brother's orchards on the 8th, and it was worse than he had ever seen it, and on the next day it was as bad at his house (Vol. 1, p. 113).

GEORGE HINSON lives near Ellijay, and says that on the 8th and 9th of June smoke came down about dinner time, and he thinks the smoke on those dates is the only smoke he noticed that did any damage (Vol. 1, pp. 121-2).

J. S. ROGERS lives near Ellijay, and says that it got the wheat along about the 8th and 9th of June. He had noticed some damage before that, but after those dates it looked like there had been a fire close to it (Vol. 1, pp. 123-4).

Other witnesses for plaintiff mentioned those dates, in connection with other dates. Hence there is no doubt that a very large part, or practically all of such damage as was done during the year 1914 to forests and vegetation in Georgia by smoke fumes, was the result of smoke that went into that section upon those dates.

The following evidence shows where this smoke emanated:

REESE testifies that on June 8th the smoke was down as far as Epworth, and hit the gardens and some shade trees. He and Professor Bain were taking photographs near the corner of North Carolina and Georgia and Tennessee. They intended to go into Georgia, but the smoke was so thick they couldn't take pictures. *It was coming from the Tennessee Copper Company's plant. He saw the smoke ascending from the top of the stack and drifting in the direction of Georgia.* They could see smoke from both plants, but none of the Ducktown smoke could be seen further than Callaway, a place about a mile or a mile and a quarter from the plant, but that from the tall stack went into Georgia as far as they could see from a mountain (Vol. 2, pp. 629-30).

J. H. QUINTRELL says that on the 8th of June he went to Isabella and stayed until twelve o'clock, and then came back to Copper Hill. When he got in sight of the Tennessee Copper Company's plant about half past twelve he could see the fumes coming out of the big stack and going right down towards Fighting Town Creek and Epworth. He is familiar with the smoke and knew something was wrong. He went to the river opposite the company's plant and turned up Fighting Town Creek and noticed damage in a field of corn, and went to the top of the hill to Fryetown, and saw the smoke had come from the stack before he reached there, and he could see the effect upon some beets and beans that belonged to his brother-in-law. That was about two o'clock, Monday, the 8th. He further says that *none of that smoke escaped from the Ducktown Copper Company's plant, for he came directly between the two plants over the ridge road and it was perfectly clear, no smoke was between them.* The Ducktown plant was in the hollow below and North of him, and the other plant was South of him; and he could see the high stack and the smoke coming out of it, and saw it going in the direction where he saw the damage; and it was hitting the ground probably five hundred to a thousand feet from the stack, and made a shadow which cut the sun off of him (Vol. 2, pp. 761-2).

M. D. RICHARDS lives at Copper Hill, and says that about the 8th of June he was in the plant of the Tennessee Company, and some gas was turned loose. Something got wrong with the acid plant, and the smoke came over reasonably strong where he lived in Hopper Town, which is half a mile, and at his place of business, which is a quarter of a mile, from the plant. He was at the plant both Monday and Tuesday, June 8th and 9th, and noticed that four furnaces were being run, and that they were putting green ore into two of them. They have a cindering plant to work the fine dust which generates some little bit of smoke that is not conducted into the acid plant, but comes out of the tall stack. They shut the cindering plant down shortly after he was there, and they claimed that part of the furnace was also banked (Vol. 2, pp. 701-3).

REESE says that on the Thursday following there was a great column of smoke coming out of the Tennessee stack, and also escaping from the smelter stacks of the furnace about the same as there was on the 8th, and it was going in a Southeast course, but not so much in the evening as it was on the 8th (Vol. 2, p. 981).

There is no witness who claims to have seen any smoke escaping from defendant's plant upon either of those dates.

**3rd. It is shown by the evidence beyond all question that no damage was ever done by sulphur fumes in the State of Georgia, unless it be in a very small strip in the extreme North end of Fannin County and immediately adjacent to the Tennessee plant, before the construction of the high stack by the Tennessee Company in 1906; and as there has been no increase in the amount of fumes allowed to escape from the Ducktown plant since that date, but to the contrary it has been vastly improved by the construction of the acid plant, it cannot be possible that any injuries to forests or vegetation in Georgia now result from the operation of this defendant's furnace.**

In connection with this and the succeeding subhead, it is important to have in mind the several methods used by this defendant and the Tennessee Company and its predecessor, for smelting ores, and the dates upon which changes in those methods were made.

The first process used was to expel the greater part of the sulphur by roasting the ore on burning piles of wood. All the sulphur discharged escaped in clouds of sulphur dioxide gas which settled in the immediate neighborhood. After being cooled the ore was reduced in the same kind of furnace that is now used for smelting green ores.

About the same time experiments were conducted at Stechal and different mines in New Zealand and by W. H. Freeland, General Manager of the Ducktown Copper Company, who was the first person to succeed in the method now used in the United States. Mr. Renwick, who is now Superintendent of the Company, was then Assistant to Mr. Freeland. The method then discovered consists of placing the ore in the furnaces without being previously roasted, and the fuel required for the smelting operation consists of the sulphur, iron and silica, and sometimes a small amount of coke which is introduced; and the heat is produced by chemical action between these several elements. This system is known as the pyritic process (Lamoreaux, Vol. 2, pp. 803-4).

The dates when there were material changes in the methods of operation of the furnaces, and material alterations in their construction are as follows:

The Pittsburgh Copper Company (the predecessor of the Tennessee Copper Company) began roasting ore on roast heaps in 1894, and discontinued operations entirely in 1898. The Tennessee Company began roasting ore in 1901, and discontinued that process and began the pyritic system in 1904 or '05. They roasted ores, in fact, in 1903 and '04, and the most of their roasted ores were worked up in the furnace in 1905. In 1906 they constructed the high stack, and began to manufacture acid in 1908, the acid plant being from time to time enlarged as heretofore described.

The Ducktown Company began operations in 1891, and in 1898 began open roasting, and in 1902 discontinued that process and began the pyritic system, and put in operation its acid plant on June 11th, 1909 (Lamoreaux, Vol. 2, pp. 797, 803-4; and Shiflett, Vol. 1, pp. 470-1).

Keeping in mind the year 1901, when the Tennessee Company began operations, and the year 1906, when it began the use of its high stack, and which was eight years before the taking of the depositions, let the evidence as to when injuries to forests and vegetation first appeared in the State of Georgia be considered. That prior to the beginning of operations by the Tennessee Company there had been no injury in Georgia is shown by those who were on what was known as the Mayfield Commission, who in the year 1901 made an inspection of the Ducktown Basin for the purpose of determining the smoke zone or the extent of territory then injured by sulphur fumes.

G. C. PARKS, who was on that Commission, says they were four days in making the investigation, and it was their sole endeavor to ascertain and report the facts truthfully; that they went in and out of the Basin at various points and traveled completely around it; that the smoke zone had gone out next to the foot of the mountains in some places about two miles from the plant, and possibly in places a little further; that towards Georgia there was smoke seen on top of the ridge just South of where the Tennessee Company's plant is now located—South of the river, probably two miles from the Ducktown Company's plant (Vol. 1, pp. 585-7).

REESE, who was also on the Commission, says that with the Ducktown furnace as a center it extended from one to two miles. They could readily detect the extent of the zone by the effect on the timber, as the leaves were then in full foliage (Vol. 2, pp. 633-4).

M. T. FOUTS, who was also on the Commission, makes substantially the same statement (Vol. 2, pp. 638-9).

A map is filed as Exhibit D to Reese's deposition, which shows the location of the smoke zone as found by that Commission (Vol. 2, p. 984).

While the smoke zone was extended by, and some damage in the extreme North end of Fannin County resulted from, the operation of the Tennessee plant, which began in 1901, yet that there was no damage in any considerable part of Georgia prior to the erection of the high stack in 1906 is clearly shown by the witnesses introduced by both plaintiff and defendant, *and that fact is practically uncontroverted.* It is unnecessary to here repeat statements of many of the witnesses, in fact, all who made mention of dates, introduced by defendant, but as illustrations of the nature of their testimony see statements of R. T. HAMPTON (Vol. 2, p. 651); J. F. McNELLY (Vol. 2, p. 662); P. F. WILLIAMS, (Vol. 2, p. 676); C. G. BAUGH (Vol. 2, pp. 685-6); R. L. TURNER (Vol. 2, pp. 693-4); T. A. BYERS (Vol. 2, p. 679).

But even more conclusive upon this question is the evidence introduced by the plaintiff, which is as follows:

J. P. VESTAL, the witness who owns a large body of timber lands in Georgia, and has for a number of years been engaged in litigation with the Ducktown Company, states that *from* 1905 to 1910 the smoke was very bad, and then for about two years it let up a little (Vol. 1, Q. 26, p. 162).

And again: "From 1905 until 1910 there was very great damage to us and then it let up until 1913, it wasn't so bad" (Vol. 1, Q. 158, p. 171).

Mr. Vestal lives at Epworth, which is but two miles South of Copper Hill, and would have suffered damage previous to that date had the smoke fumes extended any material distance into Georgia. The witness says *from* 1905, which excludes that date.

R. H. SMITH, who lives a mile and a half from Morganton, testifies that the smoke has been coming in there five or six years (Vol. 1, Q. 6, p. 197). He was asked if it wasn't true that in 1906 and 1908 and possibly in 1909 the trees were all scorched around Blue Ridge, and answered that he had seen them scorched all around over the creek and on back of the river and beyond the river from his place. He can't tell in what years that occurred, "but *it was after the high stack went up, and before the acid plants were installed*" (Vol. 1, Qs. 93-95, p. 202).

JOHN MILLER lives on Weaver Creek, about two miles Southeast of Blue Ridge. He was asked:

"When was the first year that you noticed the smoke in there doing any special damage?

A. It was about six years ago.

Q. Then it was in 1908?

A. Yes, sir" (Vol. 1, p. 192).

D. M. BUCHANAN, who lives on Weaver Creek, says that he guesses smoke has been coming in there five or six years (Vol. 1, p. 205).

And again: That he does not recollect that he noticed any damage *before the high stack was built* (Vol. 1, p. 207).

JAMES F. TEEM lives at Yukon, about six miles Southeast of Ellijay (Vol. 1, p. 69). He is asked:

"Q. 10. Tell me, please, the first time you noticed it (smoke) in there?

A. I reckon it was about three years ago that I first noticed it.

Q. 11. Do you swear that you never noticed the smoke in there until about three years ago?

A. If I did, I didn't know it was the Ducktown smoke" (Vol. 1, p. 73).

J. H. CLONTS lives on Turnip Town Creek, six miles East of Ellijay. He was asked on examination in chief:

"Q. When did you first commence seeing the smoke down in that neighborhood?

A. The first time I remember seeing so much of it come all at once was somewhere about eight or ten years ago when so much of it begun to come in there" (Vol. 1, Q. 18, p. 80).

C. S. NORTHCUTT, who lives in Turnip Town settlement, says that to the best of his recollection he noticed smoke in there seven or eight years ago (in 1906 or '07) (Vol. 1, p. 95).

ASBURY HINSON lives in Turnip Town, and looks after the Arnold orchard. He said on examination in chief that he has seen smoke in that community off and on for nine or ten years (Vol. 1, p. 99). On cross-examination he says it is something like seven or eight years since he first noticed smoke in there, and didn't notice any before that time (Vol. 1, p. 102).

W. A. PAINTER, of the same locality, says on examination in chief that the first time he noticed smoke in there was about six years ago (Vol. 1, p. 107). On cross-examination he says the first smoke of consequence he noticed was about five or six years ago, and he first noticed effects from it four or five years (Vol. 1, pp. 108-9).

W. S. HINSON lives at Owltown, three miles from Ellijay, on the Carter Cay River. He says he has noticed smoke in there off and on for six or eight years (Vol. 1, pp. 112-15). He has noticed damage to fruit five or six years, and perhaps three, four or five years he has noticed damage to peas and oats (Vol. 1, p. 115).

GEORGE HINSON lives near Ellijay, and has lived there eight or nine years, and has seen smoke there nearly every year for several years, but lived there before the smoke bothered them. It was two or three years after he moved there before he noticed any bad effects (Vol. 1, pp. 118-20).

J. M. WITHROW lives at Mountain Town, Northwest from Ellijay. He first noticed smoke there about seven years ago (Vol. 1, p. 128), in 1908 (Vol. 1, p. 130).

A. E. SHARPE lives at Turnip Town, but is the woodsman for the Shippen Lumber Company and has been all through the mountains (Vol. 1, pp. 133-5). The first he remembers noticing smoke damage was something like five to seven years ago. It then appeared close to Blue Ridge (Vol. 1, p. 139). Again he says that he first noticed it from five to seven years ago along about 1907 or '08. The timber began to die, the hickory quickest (Vol. 1, p. 150).

T. S. JOHNSON, who lives on Carter Cay, says that when he lived back on the Blue Ridge in coves he made good potatoes, which was ten years or more ago, *before the chimneys were put up.* He was then much nearer the furnaces (Vol. 1, p. 188).

T. R. HARKINS, who lives on Jacks River, says that smoke first came in there something like five or six years ago, or perhaps longer (Vol. 1, Qs. 1-6, p. 239).

J. M. CARTER lives in a mile and a half of Morganton, and is one of the plaintiff's strongest and most emphatic witnesses. He says his oats and other crops were ruined in 1913, but testifies that he first noticed damages on his place six, seven or eight years ago, *after the high stacks were put in* (Vol. 1, Qs. 31-36, p. 214).

W. M. BAILEY lives at Burnett, which is six miles Southwest of Blue Ridge (Vol. 1, pp. 218-9). He was born and raised in the county, and says "It (the smoke) has been in there every year for the last *eight* years" (Vol. 1, Q. 38, p. 220).

J. G. DeWEESE lives four miles Northeast of Ellijay and is President of the Farmers' Union (Vol. 1, p. 346).

He testifies:

"Q. Wasn't it (when he first noticed smoke) just about that time that the Tennessee Copper Company's high stack was erected?

A. Just about the time the Tennessee Company constructed that high stack I noticed the smoke first.

Q. Prior to that time you didn't notice it, the first was just after that time when you first began to notice the smoke in there?

A. Yes, sir" (Vol. 1, p. 348).

W. H. CARVER, who lives at Madola (Vol. 1, p. 460), says that it was about 1906 or 1907 when it began to kill stuff (Vol. 1, p. 462).

Even W. H. Shippen testifies that when he came to Georgia one company was using roast heaps, but *that couldn't affect the forests in his territory* (Vol. 1, Q. 24, p. 320), and Frank E. Shippen fixes the length of time, during which the farms, timber and orchards have been in an unhealthy condition, the preceding four or five years (Vol. 1, Qs. 30-1, p. 395), and again says that for the last *six or seven* years the growth of the timber will show for itself (Vol. 1, Q. 46, p. 399).

Thus plaintiff's witnesses, who live in the very sections where extensive damages are claimed, testify positively that there were no injuries from smoke in their sections prior to the construction of the high stack by the Tennessee Company; and but very few witnesses, and they manifestly of strong prejudice, make any claim that any damages have resulted from the presence of smoke in their locality prior to 1906. Certainly there is no evidence in this record to show that such conditions existed prior to the erection of that high stack in 1906, which would justify the issuance of an injunction in this case. The evidence heretofore cited, it is insisted, refutes conclusively the claim of these witnesses that any material injuries have been done in these sections within the last three or four years; but *according to their own claims the injuries originated with the erection of the high stack of the Tennessee Company in* 1906.

**4th. That no injury to the forests of North Georgia has been done by this defendant is further shown by the fact that the checks of the timber's growth were contemporaneous with the beginning of operations of the Tennessee plant in 1901, the change to the pyritic process by the Tennessee in 1904-5, and the construction of its high stack in 1906.**

The age of a tree can be determined by taking a cross-section and counting the rings, and the rapidity of its growth in any season appears from the size of the ring made during such season. Hence, the history of the growth of a tree can be determined with absolute accuracy by an examination of its rings; and if a number of trees be examined and the history of them all corresponds, it is very strong evidence that each of them was affected from time to time by the same causes.

PROFESSOR BAIN says that this method of determining the growth of trees and when checked from any cause is well recognized by German students of smoke injury. He is familiar with the German language and reads it continually, and he had present when his deposition was taken an illustrated German work written upon that subject, and he files as Exhibit No. 65 to his deposition a photograph of a picture taken from that work (Vol. 2, p. 926).

In making his several tours through North Georgia and around the Ducktown Basin he examined a large number of stumps, took a number of sections from trees, and also obtained a number of cores from other trees by an increment borer. He says that he found all around the Ducktown Basin, and even up in the foot hills around the edge of the Basin in the mountain regions, that by far the greater injury from smoke occurred subsequent to 1905, that is, the growth checks began for the most part in 1906 or 1907, and in some cases in 1901 and '02 (the date when the Tennessee Company began operations); a very few began in 1894 (when the Pittsburgh Company began operations); and some specimens showed growth checks from 1894 to 1898 (period during which Pittsburgh Company operated) with improved growth until 1901, and then much greater checks. The condition was practically the same in North Georgia. He found very few trees near the Tennessee line that showed any check before 1901. He has no record of having found a tree in Georgia in which the check began in 1891 (date when Ducktown Company began operations) (Vol. 2, pp. 923-926).

He files as Exhibits Nos. 66 to 72 (excepting Exhibit No. 67, a color photograph of the locality where Exhibit 66 was found) blocks taken from trees which corroborate his statement with reference to when the growth of the timber was checked. Where his photograph Exhibit No. 67 was taken a number of dead trees had the appearance of having been killed by a fire, but he found upon examination that fire was not the cause of their death. The first tree from which he took a chip established growth checks beginning about 1906 or '07, so that if the tree died from the effect of the smoke it was killed from its application not earlier than 1906 (Vol. 2, pp. 927-9). On his trip in January he took approximately twenty-eight cores from trees, and the history of the growth as shown by the cores corresponds to that shown by the blocks (Vol. 2, p. 930).

Plaintiff's proof upon this subject, as far as it extends, fully confirms the conclusions reached by Professor Bain from his examinations.

DR. HEDGECOCK and MR. CLARK, plaintiff's experts, concede that the growth of a tree in every season can be determined with accuracy by a careful examination of a number of sections taken therefrom, yet they endeavor to impeach the reliability of Professor Bain's conclusions by criticism of the increment borer. It is shown, however, that even when a tree grows without uniformity, the *relative* sizes of the rings very generally correspond all the way around the tree.

But the reliability of cores obtained by an increment borer is of but little importance, as the testimony of plaintiff's witnesses and exhibits filed by them corroborate Professor Bain. Dr. Hedgecock and Mr. Clark, while at a saw mill on Fighting Town Creek, made measurements of eight pine stumps, the trees from which had been cut during that season, for the purpose of ascertaining the average growth during, first, the seven years from 1906 to 1913; second, the seven years from 1899 to 1905; and third, during the entire growth of the tree (Vol. 1, pp. 430, 431, 434, 435). While his table is somewhat difficult to understand, yet it appears that the growth for those periods of each of these several trees was as follows:

| | 1906-1913 | 1899-1905 | Entire period |
|---|---|---|---|
| No. 1 | .12 | .22 | .28 |
| No. 2 | .11 | .22 | .33 |
| No. 3 | .11 | .2 | .3 |
| No. 4 | .11 | .22 | years not given |
| No. 5 | .18 | .22 | " " " |
| No. 6 | .13 | .31 | " " " |
| No. 7 | .13 | .23 | " " " |
| No. 8 | .13 | .23 | .25 |
| Average of the 8 specimens | .13 | .22 | .29 |

(Fractions less than hundredths not given).

*It thus appears that the growth for the seven years succeeding the construction of the high stack by the Tennessee Company averages but little more than half of what it was for the previous ten years,* and that the average for the second period, 1899 to 1905, is not one-third less than the average for the entire period of growth. Furthermore, Professor Bain testifies that after the first few years the extent of growth is generally greater than subsequently; that is, the larger rings of trees are those which are formed immediately after the first few years of their existence, which accords with the observation of every man who has had any experience with timber (Vol. 1, Q. 379, p. 928). Therefore, the measurement of these large rings greatly increased the measurement for the entire period, ~~and~~ accounts for what excess there is of growth for the entire period over the seven years from 1899 to 1905.

Precisely the same result is shown by the five sections of trees taken by Frank E. Shippen from his lumber yard near Cherry Log, a station on the L. & N. Railroad nearly half way between Blue Ridge and Ellijay, and filed as Exhibits to his deposition (Vol. 1, pp. 400-401). On cross-examination he is shown these sections, and testifies with reference thereto that Exhibit 1 shows no arrest of growth until about 1907 or '08 (Vol. 1, Qs. 263-4, p. 424); that with No. 2 the decrease in growth "looks like it has been the last six or seven years" (Vol. 1, Qs. 267-70, p. 424); that Exhibit No. 3, a cross section of a poplar, shows that the last growth check was six or seven years ago, there having been another check something like fifty years ago (Vol. 1, Qs. 271-6, pp. 424-5); that Exhibit No. 4 shows no check in growth until 1906 or '07 (Vol. 1, Q. 277, p. 425); and that Exhibit No. 5 shows that the check in growth was seven or eight years ago (Vol. 1, Q. 278, p. 425).

These exhibits were filed by Mr. Shippen to refute the claim that there had been an improvement within the last three or four years. But the witness testifies that within the last year they have sawed something like seven hundred thousand logs (Vol. 1, Q. 286, p. 426); and it is remarkable that only these five sections are offered as evidence; and it is certainly very significant that every one of them agrees perfectly with the numerous stumps, sections and cores examined by Professor Bain, and with the measurements of stumps made by Dr. Hedgecock and Mr. Clark.

The forests of North Georgia have thus been made to speak for themselves, and when there is such accord among its individual members, the inference to which they point, that this defendant has not caused any checks of growth of forests in Georgia, is irresistible.

**5th. Evidence as to smoke which it is claimed was seen in Georgia on the 1st, 2nd, 3rd, 4th and 5th of July, 1914, and May 12th, 1913.**

Plaintiff introduced Mr. G. M. Panhorst, Chief Clerk of the Tennessee Copper Company, and proved that the furnaces of the Tennessee Company were shut down on May 4th, 1913, and one furnace resumed operation on May 16th, and the remaining on May 17th, 1913, and that they were again shut down on June 23rd, 1914, and one resumed on July 6th, and the remaining on July 7th, 1914. Very great effort, therefore, has been made to prove smoke damages during those periods, as defendant's company alone was then operating. Doubtless Fannin and Gilmer Counties were canvassed from end to end for the purpose of procuring testimony with reference to these dates, and every particle of evidence which could possibly be obtained from sources greatly biased was introduced. And while several witnesses have testified with reference thereto, it is remarkable that the number is not much greater.

It is believed that the entire testimony upon this subject is as follows:

R. H. SMITH, who lives one and one-half miles South of Morganton, says he saw smoke there on July 3rd, but *noticed no damage* (Vol. 1, p. 197), and "I don't know anything of mine was hurt on the 3rd of July. I never noticed" (Vol. 1, p. 202).

J. H. TURNER lives on the river a mile from Morganton, and says the smoke "was thick like a big fog; my Irish potatoes were right there at the barn, and some tomatoes, and they wilted right up. I left there about twelve o'clock and the next day I come back on the 4th" (Vol. 1, Q. 41, p. 249). "The leaves and the weeds they were wilting before I left" (Vol. 1, Q. 116, p. 256). No other witness describes so bad conditions as this one. He and witness Smith were together, but Smith's testimony is mild by the side of his.

To rebut the statements of these witnesses defendant introduced J. M. DAVIS, who lives four miles East of Blue Ridge on Toccoa River within a mile or a mile and a quarter of Turner, and a mile and a half or three quarters of Smith, and *owns the place on which Turner lives,* and who testifies that he has been cultivating corn, potatoes and peas, and they were up and growing by the first of July, but were not injured by smoke during the year. He hasn't seen a particle of smoke signs on his place, nor have his crops been injured in any way from smoke fumes. He has not noticed around Turner, but in his neighborhood he hasn't seen a single leaf discolored by Ducktown smoke during the year. He gave attention to it because there was an appropriation made by the Tennessee Company, and he thought he might as well have a part of it as anybody (Vol. 2, pp. 1083-4); and W. E. ROGERS, who lives four miles from Blue Ridge near Morganton, on the Toccoa River, and on a farm adjoining the one on which Turner lives, and within a mile of Smith. He owns about three hundred acres of land and raises corn, peas, hay, millet, potatoes and other garden stuff, and raises garden truck to sell. His garden patch is about a quarter of a mile from Turner's garden, which is on the side of the public road, the main road from Blue Ridge to Morganton. While he has noticed some smoke through there during the year, making it look kind of hazy, yet he couldn't tell that any of his crops had been injured during the year. He watched very closely because there was so much talk about damage and so many putting in claims, and he didn't notice any discoloration on the leaves. His peas were about two hundred yards from the land that Turner was cultivating, there being just a small branch between the two tracts (Vol. 2, pp. 1085-7).

Photographs Exhibits Nos. 122 to 128 to J. E. Thompson's deposition were taken in that immediate vicinity, and show that there was no damage to vegetation there. They are explained by the witness Rogers (Vol. 2, p. 1088).

L. C. ALLEN, plaintiff's witness, lives one and a half miles South of Morganton, on E. W. Chastain's farm (Vol. 1, p. 230). He says smoke was in there on the 1st, 2nd, 3rd and 4th of July, and was the worst on the 2nd and 3rd he ever saw it (Vol. 1, p. 230-1). This is the witness who kept his records by placing a cross mark opposite dates on an almanac, and who preserved the record for indicting parties in the same way and on the same almanac. He habitually files claims (Vol. 1, pp. 231-5). He describes no injury resulting from the smoke. *Photograph Exhibit* 125 *to Thompson's deposition shows the farm upon which this witness lives.*

D. M. BUCHANAN, who lives on Weaver Creek, says that on the 2nd and 3rd days of July smoke was pretty bad (Vol. 1, Q. 36, p. 204-5); but he apparently claims that the damage he suffered was done in May and June (Vol. 1, Q. 28, p. 207).

Plaintiff introduced the following witnesses who testified about seeing smoke from the 1st to 6th of July, at Epworth and points South and Southwest of Epworth.

J. H. SETZER lives at Epworth (Vol. 1, p. 454), and says that smoke was over there on July 3rd, and about the 8th and 10th of June. He saw where it bit the corn and peas and crimped them up and killed them Vol. 1, pp. 454-5), but it isn't certain that he means those effects followed its presence on July 3rd.

On cross-examination he says he has talked with Vestal about the case, and saw Vestal whispering to lawyers, as he was being examined. He was a witness for Vestal when the jury decided the case against him (Vol. 1, p. 456).

W. H. CARVER lives at Madola. He noticed smoke on July 3rd (Vol. 1, Q. 17, p. 461). A neighbor of his was sitting on the porch, and he saw the smoke from the plants and made mention of it on that day (Q. 18). It had no effect on anything at his house. It was going around the mountain, and didn't reach up to his house (Vol. 1, Qs. 21-3, pp. 460-1).

W. H. MARTIN lives near Burnett, and says that smoke was in that section July 3rd and 4th, and he could see the effects on the timber and growing crops some (Vol. 1, Qs. 16-19, p. 286). On cross-examination he says he is going to sue the Ducktown Company for $800.00, and is watching for evidence. He is a member of the Farmers' Union, which has employed counsel to look after cases (Vol. 1, p. 287).

H. H. and G. W. HOLLOWAY, plaintiff's witnesses, live near Burnett. They tell of drouth being there, and of Bill Martin having them to look at his stuff during the last of June (Vol. 1, pp. 289-290). This shows that the damage around Burnett was done before the 3rd of July.

B. H. SEBOLT lives on Sugar Creek, three miles from Blue Ridge (Vol. 1, p. 265). He says that on the 2nd, 3rd, 4th, 5th and 6th of July, smoke was in there to some extent, and was bad on the 3rd and 4th (Vol. 1, Q. 29, p. 267). He went up on the mountain July 5th to Mr. Tramell's orchard. The leaves were all kinked up and dried up and he saw the smoke coming out of a stack, but not the main stack. "It didn't boil out like it did out of that big stack" (Q. 34). The smoke scattered over here through the country (Q. 37). He discovered plenty effects thereafter on the timber (Vol. 1, Q. 40, p. 267).

On cross-examination he said that he couldn't see the stack where the smoke was boiling up (Vol. 1, p. 269). *He also testified that he thinks he saw smoke on the 25th and 26th of June, and that he spoke to his son about it on the 29th or 30th of June, and told him it was the worst he had seen in years* (Vol. 1, pp. 270-1). (On those dates *both* plants were closed down).

He filed a claim the year before for $200.00, and appears to have received $10.00; and had also filed a claim for the year 1914 (Vol. 1, p. 271).

C. J. TRAMELL lives two miles South of Blue

Ridge (Vol. 1, p. 293), and says he saw it there bad all over the country on July 3rd, strong enough to smell. On the 5th he went to an orchard on the mountain with Mr. Sebolt. They saw smoke coming out of the Basin and drifting in their direction, and could see it on the mountains and hills around them, and smell it (Vol. 1, p. 295). On the 4th it ruined the tops of his tomato plants, and garden beans and vines were scorched up (Vol. 1, p. 298). He has a suit against this defendant brought for the years 1906, '07 and '08 (Vol. 1, p. 297). He went to Knoxville in June, and hadn't been there for ten years, but couldn't remember the date, yet he remembers this date when there was no apparent reason why he should (Vol. 1, p. 300). He had been talking with Vestal and Shippen (Vol. 1, pp. 300-1); and says his vegetables were seriously bit before July, in April or May (Vol. 1, p. 301).

*The conditions toward the head of Sugar Creek are shown by Thompson's photographs Exhibits* 133, 134, 135 (Vol. 2, p. 1140).

W. T. ANGEL lives one and one-half miles Southeast of Epworth and three or four miles of Copper Hill (Vol. 1, pp. 272-3). He says smoke was in there on the 3rd and 4th of July, and ruined beans and stuff and affected Irish potatoes and sweet potatoes.

On cross-examination he says it was in there in May and June, but can't remember the dates, because "I wasn't looking for it as much then as I now do" (Vol. 1, Q. 3, p. 273). His neighbor, Harvey Cochrane, said it was down in his timber all over his stuff on *June 29th,* or somewhere along there (when both furnaces were shut down) (Vol. 1, p. 274). Witness filed claim for May and was going to for July. He received $5.00 last year.

J. P. VESTAL, who lives at Epworth and had lost a suit in the Federal Court at Chattanooga which he had brought against this defendant, and who has been so active in looking up witnesses for the plaintiff, says that he had some new potatoes bit by the smoke on July

3rd, 1914 (Vol. 1, p. 169), but that "they wasn't serious bit, but they crisped up until I knew that it was smoke, because it was in my garden that day" (Vol. 1, Q. 196, p. 183).

In rebuttal defendant introduced the following witnesses who testified about that section:

J. B. KINSEY lives at Epworth, and gardens altogether every summer. He says if there was any damage from the 1st to the 5th of July, 1914, he has no recollection of it. He thinks if there had been any substantial damage at that time he would have known it, because there was a little money appropriated, and he thought he was as much entitled to it as anybody, and hence he kept dates of damage (Vol. 2, pp. 1011-12).

M. C. GOSS lives at Epworth and has lived within a mile of the place for three years. He follows the carpenter's trade some and makes some garden patches and farms. If there was any damage done there from July 1st to 5th, 1914, he did not see it, and he was looking out to see if there was anything done to his garden, because it was said that one company was paying some damage to the State, and that the State was to pay it to the individuals that were damaged, and his idea was to put in a claim if he was damaged enough to be worth anything (Vol. 2, pp. 1017-18).

A. H. CHASTAIN lives three miles and a half or four miles nearly South from Epworth, and says if there was any damage from 1st to the 5th of July, 1914, he doesn't know of it. He came from the mines home on Saturday nights and back on Sunday nights. He traveled mostly through the woods, and there were some fields along there. If there had been any substantial damage at that time he would have seen it (Vol. 2, p. 1025).

HAM HOLT lives at Blue Ridge and travels through a number of counties in North Georgia. He saw no damage through that section which had been done from the 1st to the 5th of July, 1914; and if there had been damage of consequence in that section that lies Southwardly, Southeastwardly and Southwestwardly from the Tennessee Copper Company's plant during that period he would have known about it (Vol. 2, pp. 1042-4).

With reeference to the Ellijay section, F. E. SHIPPEN, who kept dates when smoke appeared on the several mountains and valleys in view of Ellijay, says that on July 3rd the smoke was all over Flat Top and Bushy Head and Turnip Town Mountains, from seven A. M. to four-thirty P. M., and on July 5th the smoke was all over Flat Top and Turnip Town and Bushy Head Mountains, smoke strong (Vol. 1, p. 396). No other witness claims that smoke was seen on that date, anywhere in the State, at so early an hour or remained for such length of time. But he doesn't claim that any damage resulted from the presence of smoke on those dates.

For the defendant W. P. HARPER testified that he was cattle inspector for Gilmer County and was in the woods nearly every day. He passed by fields and orchards, and if there was any damage done through there by smoke from the first to the fifth of July, 1914, he didn't notice it, and he thinks he would have noticed it if there had been any damage of consequence (Vol. 2, p. 1029).

T. N. BENNETT lives one mile North of Ellijay and owns a farm, and has lived there for thirty-five years, and says that if there was any damage done through there from the first to the fifth of July he didn't detect it (Vol. 2, p. 1036).

As further refutation to all claims that any damages resulted from the 1st to 5th, or any other days in 1914, attention is specially called to the color photographs taken in the localities mentioned, and more especially to Nos. 136, 137, 138, 139 and 140, which were taken in Epworth; 133, 134, 135, taken on Sugar Creek; 104, 105 and 106, taken at and near Higdon's Store; 96 and 97, taken at Madola, and 142, taken but a short distance South of the Copper Hill furnace.

In all North Georgia the following six men were the only persons found who were willing to state that they saw smoke in Georgia while the Tennessee furnace was shut down in May, 1913.

T. R. HARKINS lives on Jacks River, and says that he saw smoke come out of the Basin on May 12th, 1913. He was up on the mountain and could see it come in and could smell it when he came down into it. It discolored the timber, and some of the timber died (Vol. 1, Qs. 58-66, p. 238). Smoke was in there before that. However, he says there was a frost on June 10th and 11th, and it was cold (Vol. 1, p. 242). The 12th of May is the only date he claims to remember, though he says it came in many times (Vol. 1, p. 243). He also says *there was a big high stack and he could see it mighty plain, and the smoke was coming from it* (Vol. 1, p. 246).

It is apparent that the stack the witness saw was the stack of the Tennessee Company, and if the witness saw any smoke in there at all he is mistaken with reference to the date. He for some time worked for Vestal, and Vestal was present when his deposition was taken whispering to counsel (Vol. 1, p. 246).

W. M. BARNES lives at the foot of Barnes Mountain (Vol. 1, p. 257), and he says he saw smoke that killed peas on May 12th, 1913 (Vol. 1, p. 258). Mr. John P. Vestal came and asked him to look at his garden peas, and they were folded up and drooped over, kinder blackish and crimped up (Vol. 1, p. 258). This witness filed a claim for all damages suffered during the year and received $30.00 (Vol. 1, p. 263).

B. F. WEEKS lives two miles from Ducktown, just over the Georgia line (Vol. 1, p. 350). He can't be positive as to exact dates, but thinks smoke came in there 11th and 12th of May, 1913. It was on Sunday after he came home from Chattanooga, where he attended as a witness for Vestal (Vol. 1, p. 351). He noticed some damage to the beans, but it wasn't a great deal (Vol. 1, p. 351). On cross-examination he says the smoke did a little bit of damage to English garden peas (Vol. 1, Q. 32, p. 354), and there was nothing else in the garden that attracted his attention (Vol. 1, Q. 56, p. 395).

A. J. BELL lived four miles from Isabella, in the edge of Cherokee County, North Carolina (Vol. 1, p. 277). He says he was in Chattanooga as a witness for Vestal and returned the 7th of May, and on the 7th and 8th for a week or more smoke came in there, and corn was burnt like killing frost and potatoes were bit. His land bordered on the Georgia line, and he would come into Georgia every week or so (Vol. 1, pp. 279-80).

On cross-examination he says he had had a suit against the company a number of years before, and it appears that he was a settler of suits against the company, and had been a witness against it at least a dozen times. He came in the court room with Vestal, who with Shippen were present when his deposition was taken (Vol. 1, p. 281).

J. H. SETZER, who lives at Epworth, had a crop on J. P. Quintrell's place in 1913, and says that on the 11th and 12th of May it bit his corn and potatoes (Vol. 1, p. 456). There appears no reason why he should have remembered that date.

And Vestal claims that on May 12th, 1913, the day after he returned from Chattanooga when there was a mistrial in his case against this defendant, the smoke bit three rows of garden peas and some corn at his place (Vol. 1, pp. 170-182).

This date was so remote that it was impossible to procure any witnesses who remembered specially about it. But the claim that damage of any consequence was done at any time in that year in Georgia is refuted by the mass of witnesses whose evidence has been heretofore cited. Four or all but two of plaintiff's witnesses live within two or three miles of the Georgia line, while the distance the other two (Harkins and Barnes) reside from the defendant's furnace make the claim that sulphur smoke was there on that date absurd.

But suppose it be conceded that all the smoke claimed by plaintiff's witnesses floated into Georgia on the days mentioned, from July 1st to 5th, 1914, and on May 12th, 1913, and that all the damages they claim resulted therefrom, such fact would afford no ground for an injunction, because the consequences were too insignificant. Certainly the State of Georgia cannot compel the closing down of defendant's plant unless its operation causes some *substantial* injuries; and these witnesses claim practically no injuries to the forests, and comparatively little to their crops, and those they describe to their gardens are of an insignificant character.

## IV.

### Changed conditions as respects litigants since 1907, whereby Georgia has now no equitable right to insist upon a final injunctive decree against the Ducktown Copper Company.

The bill herein was exhibited against the Tennessee Copper Company and the defendant Ducktown Copper Company jointly. Present counsel had no connection with the case then, but apparently there was a joint defense, and no effort to fix responsibility as between the two companies. The former opinion seems to have assumed they were jointly at fault, but it did not turn "on any nice question of fact" (206 U. S., 236). Without comparing the operations of the joint defendants, the opinion recites that the gas generated by them was "carried by winds great distances and over great tracts of Georgia land" threatening damage on "so considerable a scale to the forests and vegetable life, if not to health, within the plaintiff state as to make out a case within the requirements of *Missouri vs. Illinois, 200 U. S.,* 496."

In this connection it should be noted there has never been but one tall stack—that of the Tennessee Copper Company, completed in the spring of 1906, which is 325 feet high. Yet the former opinion recites the plaintiff state then thought "that the tall chimneys" (as if each company employed them) "in present use caused the poisonous gas to be carried to greater distances than ever before."

We recognize that plaintiff is here asserting "quasi-sovereign rights," but this, as stated in the opinion above, does not exclude "considerations that equity always takes into account."

Having regard to such considerations, it is our view that the relations of plaintiff and defendant Tennessee Copper Company, to each other and to this litigation, have so materially changed, when compared with the record of 1907, as to constitute a materially "changed condition" within the purview of the order permitting proof herein regarding "changed conditions." And that when fully understood, such "changed conditions" quite justify a refusal of the order plaintiff now asks, and likewise warrants a dismissal of this action as against the Ducktown Company.

The officials of Georgia have throughout contended only for what to them seemed right, and no criticism is intended of any action by them or by the state. But it is apparent from the full record that the state has been imposed upon, and in the prosecution of this action has been used to promote private and selfish interests of individuals. This is shown beyond question by the cross-examination and conduct of W. H. Shippen and F. E. Shippen, large stockholders, and president and vice-president respectively of Shippen Bros. Lumber Company, both of whom are most prejudiced and antagonistic witnesses against this defendant.

The Shippen Bros. Lumber Company held or claimed by deeds, leases, etc., many thousand acres of timber land near the Tennessee line prior to the institution of this suit, and continuously since. Witnesses W. H. Shippen and F. E. Shippen, up to the handing down of the original opinion herein, owned 1560 shares of the company out of a total of 4500. The company was capitalized at $1,000,000.00, divided into 10,000 shares. The Shippens maintained that the lands of the company were being damaged by fumes from the smelting operations, and insisted to both companies that their claims should be recognized. Both companies at first declined to treat with them. They did not enter the Courts, claiming they could not get justice there. Accordingly, they undertook to force a payment to the Lumber Company, and in addition the payment of large sums directly to themselves, in consideration of their passivity and quiescence—after they had largely induced the institution of this litigation—as respects the legislature, newspapers and the public generally. The activity of the Shippens, their connection with the litigation, that they inspired it with a view to individual profit, and that they have profited thereby, are matters clearly disclosed from their own testimony, and not disputed.

W. H. Shippen recently deposed, after recounting his and his brother's efforts to have this suit filed, in part as follows:

> "For years deponent, with his brother, labored with the owners of timber in North Georgia, with legislators, with the legislature itself, with committees from the legislature and with different officials of the state and in the scientific study of the character of the fumes, the extent to which they would go and the injury inflicted. After almost numberless appeals to the public authorities, to the newspapers, to scientific magazines, and using every influence in the world that could be brought to bear upon the situation, deponent, with his brother, finally got the movement into a compact, well organized condition where it presented a formidable front to the further infliction of the damage.
>
> "The State of Georgia was finally induced, almost entirely by the labors of the deponent and his brother, to file a bill in the United States Supreme Court." (Vol. 1, pp. 523, 545).

W. H. Shippen further states of his connection with this case that—

> "In the preparation of the trial, deponent procured, and caused to be procured, thousands of affidavits, which, when printed, filled several volumes of printed matter as a part of the record of the litigation. * * * This litigation resulted in an adjudication by the Supreme Court of the United

States that a nuisance existed which should be stopped." (Vol. 1, pp. 524, 545).

Immediately after the former decision was announced, W. H. Shippen requested a confidential friend and associate stockholder in his lumber company, whom he addressed as "My Dear Mr. Patton" to visit Martin Vogel, Esq., a New York attorney and counsel of Tennessee Copper Company, and picture to Mr. Vogel the happy results that would follow if the Shippens were appeased. He wired this friend and then confirmed it by letter, a quotation from which is:—

> "Supreme Court Clerk Washington wires Copper Co. injunction granted. Am also handing you clipping from Atlanta Constitution which shows we have all we asked for. Judge Hart gives me full credit for the whole, and as to what the other side thinks of my efforts in the matter, would like for you to ask the attorneys of the copper company. By the way, it might be well for you to drop in on Martin Vogel, 170 Broadway, the next time you are in New York and feel him. You know nothing of the case, and see what he says. We ought to be losing no time now in going for damages in earnest, as our case is now made out." (Vol. 1, p. 534).

The original opinion was handed down on May 13th, 1907, and three days later, or on May 16th, W. H. Shippen wrote his friend Mr. Patton further, in part:

> "Now, it is my decided opinion that I should get busy at once and see what can be done about settlement of our claim with these people, and I am of opinion that they would settle with us promptly to get me out of the way and use my action to control the others who have claims against them. I should see their attorney in New York at once, but cannot leave here with things in the shape they are now." (Vol. 1, pp. 534-5).

The letter, considered in connection with W. H. Shippen's testimony and affidavits, reveals what the

Shippens had in mind prior to the institution of this litigation, during the time they were engaged with the propaganda that lead up to it and the subsequent proceedings down to the final decree. And further that they reaped a rich harvest from the efforts they had put forth. W. H. Shippen was correct in his belief that the time was opportune to strike the New York attorney for a settlement of their claim,—which, as we will subsequently show, they, in common with others, viewed as resulting well nigh solely from the operations of Tennessee Copper Company.

What negotiations immediately followed the visit of Mr. Patton to the attorney of the Tennessee Copper Company in New York does not appear, but on March 27th, 1908, there was a called meeting of the stockholders of the Shippen Bros. Lumber Company, in New York City, at which President W. H. Shippen and other stockholders attended. The particular matter for consideration was negotiations between the Shippen Company and the Tennessee Copper Company. No claim had been filed by the Shippen Company in the courts. No suit was pending. The matter was simply a "claim." As a result of this called meeting and conferences with Attorney Vogel, an alliance between the Shippens as individuals, their Lumber Company and the Tennessee Copper Company was formed. The arrangement consummated was as follows:

(1) The Tennessee Copper Company paid and guaranteed to the Shippen Company $50,000, one condition of which was that the Shippens, as individuals, were to cease "activities against the Tennessee Copper Company" from that minute (Vol. 1, pp. 525-6).

(2) The Tennessee Copper Company agreed to co-operate with the Shippens and to assist in retaining W. H. Shippen as President of the Lumber Company at a substantial salary (Vol. 1, p. 542).

(3) The Shippen Lumber Company gave to Tennessee Copper Company—

"a full and general release for any and all dam-

> ages that may arise from the operation of its smelter plant or from any smelter plant it may have or which it may hereafter have, by reason of smoke, fumes and gases passing over and upon the lands or timber now owned or controlled, or in which said lumber company is now interested * * * without limitations in respect to any increase in the amount or intensity of such smoke, fumes and gases or from any present or future method of operation, etc." (Vol. 1, p. 538).

(4) The Shippen Company granted to the Tennessee Copper Company—

> "a right of easement by which said copper company and its successors and assigns may maintain and operate smelters or plants as it may require and allow and permit the smoke, fumes and gases therefrom to pass over and upon said lands, timber, options and interests as aforesaid, without let, hindrance or molestation of said lumber company, its successors or assigns, creating by said instrument a perpetual servitude, easement or estate, which shall run with the land in favor of said copper company, its successors and assigns, and against said lumber company," etc. (Vol. 1, p. 538-9).

The thrifty Shippens were not satisfied with the payment of $50,000 to their Lumber Company, but as suggested in the letter from W. H. Shippen to "My Dear Mr. Patton," they thought the time propitious for disposing of their then holdings in the Lumber Company, and the facts with reference to the proceedings herein by the State of Georgia, and the manner in which the Shippens were to profit thereby did not appear until recently disclosed in a proceeding in the United States Court at Atlanta brought by other stockholders of the Shippen Lumber Company against witnesses W. H. and Frank Shippen.

Judging from the dates of the several instruments there filed, while the "negotiations" between the Lumber Company and Tennessee Copper Company were progressing openly and in the presence of the stockholders at the called meeting in New York, there were collateral negotiations between the Shippens as individuals and Tennessee Copper Company, through one Oscar B. Van Sant, a clerk in the office of the Copper Company, whereby the Copper Company, through Van Sant, was to take over all the holdings of the two Shippens at a premium of 50 per cent,—although the stock was then worth much below par. For these holdings the Shippens were paid, or guaranteed, by the Tennessee Copper Company, $234,000 (Vol. 1, p. 541).

In part consideration therefor the two Shippens, as individuals, contracted with the Tennessee Copper Company—

> " * * * that they will not act with any other parties or do anything against the interests of the Tennessee Copper Company, as they may be advised by said Tennessee Copper Company" (Vol. 1, p. 543).

The Tennessee Copper Company guaranteed full performance of the contract by Van Sant, and for fear that it did not possess the corporate power to make such guaranty, Mr. Frederick Lewisohn, principal owner of the Tennessee Copper Company stock, guaranteed that the Copper Company possessed the legal power in the premises, and that this guaranty was a legal and binding guaranty (Vol. 1, p. 544).

It thus appears that the Shippens, as individuals, were to receive and the Tennessee Copper Company was to pay the munificent sum of $234,000.00 for their stock in the lumber company, and the Shippens were not to antagonize, which means, of course, that they were to promote the interests of the Tennessee Company. The Tennessee Company thereby secretly obtained two friends, not only among the officials of the lumber company, but among those most active in inducing and pressing the State of Georgia forward in its efforts, which up to that time had been directed against both companies. It may be justly stated from the present record that thereafter, in the management of the State of Georgia's case, so far as the Tennessee Company was concerned, there were two traitors in the camp who had been paid their price. The facts disclosed clarify some things which had appeared mysterious before, one being the lenient attitude of the State of Georgia with respect to the Tennessee Copper Company, while pressing vigorously against the Ducktown Company. Another remarkable circumstance appearing is, that smoke is emitted at all times in great volumes from the high stack of the Tennessee Company located on the Georgia line—while complaint is made of the much smaller volume emitted from the much lower stack of the Ducktown Company three miles further removed from Georgia. And still another significant circumstance is that the Shippens are so antagonistic in their evidence against the Ducktown Company, endeavoring to fasten upon it all the injuries resulting from smoke fumes, and at the same time endeavoring to excuse in every way, the Tennessee Company. The value of the testimony of W. H. Shippen may be easily judged by the equivocations and quibbling on cross-examination. He at first pretended that the lumber company compromised, or gave an easement over its protest (Vol. 2, pp. 332-3). That he did not know the terms of the settlement; that he didn't know the Tennessee Plant was larger than the Ducktown plant; or that the Ducktown plant was further from the Georgia territory. He maintained that the Ducktown Company helped to increase damage claimed after the construction of the high stack by the Tennessee Copper Company, although the former did not increase its output or the height of its stack (Vol. 1, pp. 336-7). He was not frank enough to admit when first shown the "My Dear Mr. Patton" letter that he wrote it (Vol. 1, p. 515). He declined to answer whether, after selling the stock of himself and brother to the Tennessee Copper Company at a fabulous price, he immediately purchased other stock to take the place of that sold at a greatly reduced figure (Vol. 1, pp. 516, 528). He insisted the Ducktown Company "has ignored us and treated us with disdain" (Vol. 1, p. 529).

This is the same W. H. Shippen who was a member of the commission which reported to the Governor of Georgia September 24th, 1906, regarding the operations of the defendants, and in which report, with respect to the stack of the Tennessee Copper Company, the following appears:

> "The high stack of the Tennessee Copper Company has in no wise relieved the situation. On the contrary we find the evil spreading at an alarming rate in all directions." See "Supplemental Evidence and Exhibits" by Hon. John C. Hart, Attorney General, October Term, 1906, p. 6.

In the same connection Judge Hart observed, with respect to the capacity of the two companies in 1905 and subsequent—

> "Since said date the Tennessee Company has more than doubled its furnace capacity, while that of the Ducktown Company has remained unchanged, giving a ratio of production of *at least seven times* as much by the Tennessee Company as by the Ducktown Company." (See Supplemental Evidence and Exhibits by Judge Hart, October Term, 1906, page 3).

The principal witness for the plaintiff on the former hearing was Prof. John M. McCandless, State Chemist, a scientific man of great learning. It will be seen that Judge Hart justifies his conclusions throughout by reference to the testimony of this witness. And the same witness, McCandless, signed the report above wherein special reference is made to "the high stack of the Tennessee Copper Company." It is also worthy of note that this same Prof. McCandless recently testified herein that there were no damages of consequence resulting from the operations of the Ducktown Company since its acid plant was installed (Vol. 1, pp. 385-9).

Judge Hart conceded the injury to Georgia territory began with operations of the Tennessee Copper Company, as witness the following quotation from his argument—

> "The injury in Georgia has been accomplished within the past five years, but more injury will be done per month during the spring and summer of the present year than was accomplished throughout the entire year at the beginning of such period. In the Ducktown locality up to the year 1900, the Ducktown Company was operating on so small a scale that the effects of its fumes were not perceptible as far distant from that plant (located several miles from the nearest Georgia territory) as the Georgia line. The Tennessee Company began smelting to a limited extent in the latter part of 1901, but it was not until the spring of 1902 that anything like extensive operations were begun." (See Argument and Exhibits of General Hart, October Term, 1905, page 2).

Judge Hart referred to the Tennessee Copper Company as the "chief offender," thus—

> "Shortly thereafter the Tennessee Copper Company, the chief offender, by reason of its large production and location of its plant, removed its roasting plant from a point several miles within the interior of Tennessee to a location but a few hundred yards distant from the Georgia line and began roasting its ores through furnace smelters, producing and liberating gas in much stronger form and diffusing said gas directly upon Georgia soil without even the leavening influence of several miles of atmosphere formerly intervening under the location and operations as at the time the first bill was filed. In addition, the Tennessee Copper Company was and is engaged in more than doubling the capacity of the plant, which, if allowed to operate as enlarged, will more than double the production of sulphur dioxide first complained of." (Ib., p. 3-4).

Of the operations of the Ducktown Company he correctly observed—

> "The remaining defendant, the Ducktown Sulphur, Copper & Iron Company, is still producing said fumes to about the same extent as when the first suit was filed." (Ib., p. 4).

In his argument in 1905, General Hart concluded, from the evidence, not only that the Tennessee Copper Co. was the "chief offender," but that its "present works were built with full knowledge by such company of the injury they would inflict upon the State of Georgia." (Ib., p. 15). He portrayed the process of the Tennessee Company then under way, its capacity, and the possible disastrous results from the tall stack, thus—

> "In addition to the works already in operation, the Tennessee Copper Company has about completed four new furnaces, more than doubling the capacity of the plant, which furnaces are connected with a chimney, which, it is asserted, will be considerably taller than the stack connected with the three furnaces in operation when the bill herein was filed. It is claimed by the copper company that the taller chimney will alleviate the nuisance, *but this claim cannot be substantiated.*" (See Argument General Hart, 1905, p. 16).

The able solicitor, justifying his conclusions by reference to the witness McCandless and others, then further observed of the Tennessee Copper Company's tall stack being erected—

> "A higher chimney will result, as shown by the affidavits of the chemists, foresters and other experts in the science of plant life, in no benefit to the injured section, except that in a mile or two of the plant, which will be accomplished at the expense of the more distant territory, as the fumes will be given additional carrying power by reason of their liberation from a higher point. With this chimney and the increased production, not only will all the injuries be multiplied, but the territory sub-

ject thereto will be enormously increased." (Ib., p. 17).

Under the arrangement with the Shippens, the Tennessee Copper Company was licensed to continue its operations with its high stack *"operated at their fullest capacity, without regard to the operation of the sulphuric acid plant."* (Vol. 1, p. 502).

The Shippens, their Lumber Company and the Tennessee Copper Company were all obligated to secrecy, to the end that the true situation should not be revealed to the State of Georgia, the Ducktown Company, a joint defendant herein, and to this Honorable Court. (Vol. 1, pp. 518-19).

Thus, a keen competitor of the Ducktown Company and a joint defendant herein became, and for years has been, a large stockholder in the Shippen Lumber Company, profiting from all revenues by it received.

It is undisputed that the "chief offender" from the outset was the Tennessee Copper Company. With the beginning of its operations in 1900-1 the first complaints were registered by citizens of Georgia. With the instalment of its high stack in 1906 the damage to more distant Georgia territory was inflicted, as all agree. It is undisputed that the stack of the Ducktown Company remains as formerly but 70 feet in height. (Vol. 2, p. 798). The distance of this plant from Georgia territory, the intervening hills between the top of its low stack and the Georgia line, and the numerous other factors entering into causation and effect are most convincing that whatever of damage, if any, is now being done within the State of Georgia is attributable entirely to the operations of the Tennessee Copper Company. This, to say nothing of the splendidly equipped and expensively constructed and efficient acid plant of the Ducktown Company, completed and put in operation since the decree of 1907.

Obviously, the pertinent facts above were not under-estimated by the Shippens. But the Ducktown Company, believing it was well within its rights, declined to bargain with the Shippens and intrigue against the State of Georgia. It declined to purchase their influence or their passivity.

Straightway, there was a resumption of former hostilities by the Shippens. Their tenants and neighbors were assembled, some of the thousand or more persons whose affidavits the Shippens had procured for the former hearing, were called as witnesses and their testimony recently taken.

## V.

**The evidence falls far short of making out a case for an injunctive decree under the rule laid down on the first hearing and under the general rules of law relating to the abatement of public nuisances.**

On the former hearing the Court said:

> "The caution with which demands of this sort, on the part of a state, for relief from injuries analogous to torts, must be examined, is dwelt upon in Missouri vs. Illinois, 200 U. S., 496, 520, 521;" and stated its conclusions from the evidence presented as follows:

> "Without any attempt to go into details immaterial to the suit, it is proper to add that we are satisfied, by a preponderance of the evidence, that the sulphurous fumes cause and threaten damage on so considerable a scale to the forests and vegetable life, if not to health, within the plaintiff state, as to make out a case within the requirements of Missouri vs. Illinois, 200 U. S., 496." (206 U. S., 237, 238).

In *Missouri vs. Illinois,* 200 U. S., 521, the Court said:

> "Before this Court ought to intervene, the case should be of serious magnitude, clearly and fully proved, and the principle to be applied should be one which the court is prepared deliberately to maintain against all consideration on the other side. See *Kansas vs. Colorado,* 185, U. S., 125." (200 U. S., 521).

The bill filed by the State of Missouri was dismissed because it was not clearly shown by the evidence that the water of the Mississippi was materially contaminated by the sewage discharged into it from the City of Chicago.

It is furthermore well recognized that the Courts should proceed with the greatest caution in determining whether an obstruction or certain acts constitute a public nuisance, and should not extend their decrees with reference thereto beyond the facts clearly proven. In High on Injunctions, Section 760, it is said:

> "But to warrant an injunction against an alleged purpresture or public nuisance, it must clearly appear that it is such in fact, and if it be doubtful whether there is a purpresture the relief will be withheld."

*Attorney General vs. Delaware and Bound Brook R. R. Co., 27 N. J. Eq., (12 C. E. Green),* 1 was an action brought to have removed a viaduct built across a navigable river on the ground that the structure was a purpresture and public nuisance. The Court held that:

> "If it were merely doubtful whether there is a purpresture or not, an injunction asked for on the ground of purpresture will not be granted. To warrant an injunction in such a case it must be clear that there is a purpresture."

And again:

> "In an action to remove an erection in a public river on the ground that it is an injury to the *jus publicum,* the common right of navigation, it must appear that a nuisance, in fact, exists, even though the erection be an encroachment on the soil of the state."

This Court has declared this principle with even greater emphasis. *Mississippi & Missouri R. Co. vs. Ward, 2 Black,* 485-495, was an action brought by a private individual to have abated an alleged public nuisance, to-wit: a bridge over the Mississippi River. The

Court in the first place held that under such circumstances the private party acts rather as a public prosecutor on behalf of all who are or may be injured; with reference to whether that part of the bridge within the jurisdiction of the Court below was a public nuisance, the Court said:

> "Is the bridge West of the Illinois boundary an *unreasonable* obstruction, and therefore a nuisance? In considering this question we must be governed by the same rule on which a court of law could proceed in case of an indictment against the bridge company for committing the nuisance; and the rule is that if the abridgment of the right of passage occasioned by the erection was for a public purpose and produced a public benefit, and if the erection was in a reasonable situation, and a reasonable space was left for the passage of vessels on the river, then it is not an unreasonable obstruction and indictable. Rex vs. Russell, (6 Boren & Crews, 566; 13 How., 623; 15 Wendell, 133).
>
> "Then, again, the obstruction to navigation must be plainly a nuisance within this rule before it can be removed by decree. If the proceeding was by indictment and the jury doubted whether the obstruction was a nuisance or not, they would be instructed to acquit the defendant; and so, if this case was referred to a jury to try the fact, and they doubted, they would be bound to acquit, and the same rule applies in a Court of Chancery when the Court ascertains the fact of nuisance. 2 Storey's Com. on Eq., 203-204."

The evidence certainly fails to show that this defendant is the cause of such injuries to forests and crops in the State of Georgia as warrant an injunctive decree under these authorities. It is not convincingly proven that any timber at all is now being destroyed, the principal claim of injuries to forests being that from time to time the foliage of restricted areas are browned, and the decided weight of the evidence, it is insisted, is against that claim. Nor does the evidence make it at all clear that any material damage is now being done to crops or gardens in the State of Georgia, the contention being that in individual instances a patch of corn or a field of oats or some tender garden vegetables, as young potatoes, peas or beans, are affected. *And if defendant's evidence be cast aside and plaintiff's alone be considered, it is left in very great doubt whether this defendant is the cause of any injury in the State of Georgia.*

That generally speaking no damage has been suffered by the citizens of North Georgia is conclusively shown by the fact that the valuation of land there has in recent years very greatly increased.

FRANK E. SHIPPEN admits that the property which was purchased by them in 1895 has increased six or eight times in value, and that the thirty thousand acres which was purchased in 1905 for $4.00 per acre is now worth $15.00 per acre, or it has nearly quadrupled in value (Vol. 1, p. 411.)

W. H. SHIPPEN even testifies that the hundred and eight thousand acres of land owned by the Shippen Lumber Company have increased fifteen or twenty times in value since they were purchased by the Company, notwithstanding the fact that they have cut five or six million feet of lumber from them (Vol. 1, p. 342).

## VI.

### Having entered into a stipulation with the Tennessee Copper Company whereby it is permitted to float smoke over its domain, and having made a similar offer to this defendant, plaintiff is not now entitled to any injunctive decree against this defendant.

A decree inhibiting the maintenance of a nuisance must be specific in its terms. It must not be broader than the facts warrant, and it must point out clearly what acts the defendant must do, or what he must refrain from doing. (29 Cyc., 1252).

*Valentine v. Webb,* 84 Mich., 38-46-49, affords a good illustration of this rule. That was an action brought to enjoin the defendant from operating a slaughter house near the complainant's premises. The lower Court "did not order the defendant to cease using the place as a slaughter house altogether, but decreed that defendant refrain from using or employing the buildings and sheds erected on defendant's premises for the purpose of a slaughter house wherein to slaughter hogs *in such a way* as to be offensive to, or become a nuisance to, the complainants; and that defendant desist and refrain from using or employing the said enclosure or building for the purpose of confining therein quantities of same or other animals *in such a way as to be offensive to and to be a nuisance to the complainants, or any of them;* and that defendant desist and refrain from using said enclosure, or any part thereof, as a drying yard in which to dry hair or bristles taken from the slaughtered swine."

With reference to this decree the Supreme Court said:

> "The trouble with the decree is that it fails to point out specifically what defendant is required to do in order to comply with its requirements. To adjudge that defendant should so conduct his business as not to be offensive is to give him no rule of conduct which the law had not before prescribed. The decree should have specifically pointed out the things that defendant was required to do, and to refrain from doing, in order to abate the nuisance which the Court found to exist."

It is not understood that plaintiff is demanding a decree restraining defendant from further operating its plant, and it would hardly be insisted by the most earnest advocate of plaintiff's rights that a decree so drastic in its terms would be warranted, if all the smoke fumes which now pass into Georgia were emitted by this defendant's furnaces. But if such a decree were entered and defendant's plant were entirely closed, it is certain from the evidence that the conditions would remain practically unchanged because of the continuance of the operation of the Tennessee Plant, and no relief would result to the citizens of Georgia. But how is it possible to enforce a decree of any other kind as long as the furnaces of the Tennessee Company are permitted to operate without being subject to a like decree of this Court? Suppose that this defendant be enjoined from injuring the corn, potatoes and beans of citizens of Georgia by the emission of smoke from its furnaces, and suppose it be cited for contempt for violation of such a decree, and it be shown that in a certain locality on a certain day the gardens were scorched by sulphur fumes. This record shows with practical certainty that such injuries would be produced by the Tennessee Company, and with absolute certainty that it could not be proven that they were caused by this defendant.

Therefore, by entering into the stipulation with the Tennessee Company and permitting it to continue its operations, plaintiff has made it impossible to enforce any injunctive decree that might be entered by the Court.

Again: By entering into the stipulation with the Tennessee Company whereby it may unmolested continue to emit smoke for a money consideration of $16,500.00, and offering to make a like stipulation with this defendant for $8,500.00, plaintiff has placed a money value upon the injuries inflicted upon its citizens, and has confessed that they are so insignificant in amount as not to warrant an injunctive decree. When the State of Georgia confessed that $25,000.00 per annum would be reasonable remuneration for all injuries which her citizens suffer from the operations of both plants, it thereby admitted that there has been no such encroachment upon her domain as to warrant a decree which would destroy these great enterprises or greatly hamper their operations and development.

## VII.

**In actions brought to enjoin the maintenance of a nuisance, if defendant ceases to maintain the nuisance at any time while the case is within the jurisdiction of the Court, and it is apparent that its resumption is not intended by the defendant, a decree of injunction will be denied.**

This principle is sustained by the following authorities:

1 High on Injunctions (4 Ed.), Sec. 572; Trulock v. Merte, 72 Ia., 510-513; Perry v. Howe Co-operative Creamery Company, 125 Ia., 415-417; McCarthey v. Gaston Ridge Mill, etc., Co., 144 California, 542-546; King v. Morris & Essex Railroad Company, 18 N. J. Eq., 397, 399, 400; Arizona Copper Company v. Gillespie, 230 U. S., 46, 55, 57.

It was under this principle, we take it, that the parties were authorized to take proof for the purpose of determining in what manner this defendant is now operating its plant.

For the foregoing reasons it is insisted that the application of the State of Georgia for a final injunctive decree be denied, and that the cause be dismissed.

W. B. MILLER,
J. A. FOWLER,
Solicitors for Defendant
Ducktown S. C. & I. Co.